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Defining and Predicting Dropout from Children's Mental Health Services: A Novel Need-Based Definition Of Dropout

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Abstract

Background: Dropout from children's mental health services has negative impacts on children, families and community mental health agencies. In order to reduce dropout, it is essential to correctly define individuals as treatment dropouts, and understand the predictors of dropout. **Methods:** Manuscript 1 describes the development of a novel need-based definition of dropout and contrasts this definition to existing definitions of dropout in the literature. Manuscript 2 uses the need-based definition to examine predictors of dropout, and compares predictors of dropout using different definitions of dropout. **Results:** The need-based definition categorizes individuals differently from existing definitions of dropout. Caregiver needs are a consistent predictor of dropout across the need-based definition and existing definitions of dropout in the literature. **Conclusions:** The need-based definition is a valuable method for categorizing individuals as dropouts or completers. It suggests families that can be targeted with engagement interventions to reduce dropout from children's mental health services.

Key Words

Dropout, child, adolescent, mental health, service utilization, premature termination, attrition, services, Ontario

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List of Abbreviations

AIC	Akike Information Criterion
BCFPI	Brief Child and Family Phone Interview
BCQ	Burden of Care Questionnaire
BIC	Bayesian Information Criterion
CAFAS	Child and Adolescent Functional Assessment Scale
CAMHS	Children and Adolescent Mental Health Services
CANS	Child and Adolescent Needs and Strengths
CAS	Child Assessment Scale
CAS	Children's Aid Services
CBCL	Child Behavior Checklist
CMHC	Children's Mental Health Centre
EBT	Evidence Based Treatment
EoC	Episode of Care
GEL	Good Enough Level
ICC	Intraclass Correlation Co-efficient
NEM	Network Episode Model
PCAS	Parent Child Assessment Scale
RCT	Randomized Controlled Trial
ROC	Receiver Operating Curve
TRF	Teacher Report Form
YSR	Youth Self Report

Chapter 1

General Introduction

Kimberly Williams Dossett

1.1 Overview of Thesis

This thesis developed an improved definition of dropout for children's mental health services, and compared this novel method of classifying individuals to existing definitions of dropout. Predictors of dropout are compared between the novel and existing definitions in the literature. Findings can guide specific interventions designed to improve service retention and engagement by helping to identify and target risk factors associated with families that dropout (McKay & Bannon, 2004).

This thesis followed the integrated article format outlined by the School of Graduate and Postdoctoral Studies at Western University. There are four chapters. Chapter 1 is a general introduction. Chapters 2 and 3 are stand-alone manuscripts focusing on dropout from children's mental health services using data from a previously conducted study on children's patterns of mental health service use (Reid et al., 2010). Chapter 2 describes the development of a novel need-based definition of dropout and contrasts this definition to existing definitions of dropout in the literature. Chapter 3 uses the need-based definition to examine predictors of dropout, and compares predictors of dropout using different definitions of dropout. Chapter 4 is a general discussion integrating the findings from the two manuscripts.

1.2 The Problem of Dropout

Dropout from children's mental health treatment has long been a concern for clinicians and community mental health agencies (Armbruster & Kazdin, 1994). For clinicians, it means children are not receiving the services they need (Saxe, Cross, & Silverman, 1988). Approximately half of all adults dropout of outpatient psychotherapy services (Garfield, 1994; Wierzbicki & Pekarik, 1993); the range is estimated to be wider for children (the term children will refer to individuals ages 5-18 years old), with somewhere between 28-75% of children

dropping out (Lai, Pang, Wong, Lum, & Lo, 1998; Luk et al., 2001). These estimates suggest that many ostensibly "treated" individuals in need of mental health services receive less than an adequate dose of care (Gonzalez, Weersing, Warnick, Scahill, & Woolston, 2011). Compared to children who complete treatment, those who drop out are more likely to experience persistence of symptoms, engage in delinquent activities, abuse substances, dropout of school and be unemployed (de Haan, Boon, de Jong, Hoeve, & Vermeiren, 2013).

For community mental health agencies, dropout results in the inefficient and ineffective use of limited services. Dropout poses a financial burden in terms of higher staffing costs, creates unnecessarily long waiting lists, negatively influences the community perception of the agency, and limits the number of people an agency can serve (Klein, Stone, Hicks, & Pritchard, 2003; Tantam & Klerman, 1979). Dropout also creates additional costs in the future, as individuals who leave with unresolved symptoms are more likely to return to care repeatedly (Kazdin, 1990). In order to minimize or prevent the negative consequences of treatment dropout, it is important to understand its predictors and determinants. Predictors are considered to be any variables associated with dropout, whereas determinants are the actual processes that lead to dropout. The prevention of dropout should result in more beneficial and cost effective treatment (de Haan et al., 2013).

The majority of research on dropout has focused on adult populations. Unfortunately, despite a sizeable adult dropout literature and a growing number of studies focused specifically on dropout from children's mental health services, little progress has been made in understanding or preventing dropout. In fact, clients (both adults and children) continue to dropout from mental health services at a rate similar to that found more than 50 years ago (Rogers, 1951). Adult findings have spurred the development of brief engagement interventions designed to address

practical and psychological barriers to treatment participation (Walitzer, Dermen, & Connors, 1999). Some work on enhancing treatment engagement has also been conducted with children.

1.3 Enhancing Treatment Engagement

Engagement is often defined as initial attendance to treatment and then retention over time. Some definitions of engagement also involve emotional investment beyond simple participation (Staudt, 2007; Yatchmenoff, 2005). Nonetheless, engagement is primarily measured by attendance. Attendance can be objectively measured, and participation in treatment is a necessary prerequisite for attitudinal or emotional investment in treatment. Engaging families in child mental health treatment remains challenging despite continuing advances in evidence-based treatment approaches and intervention efforts focused on retaining families in treatment (Gopalan et al., 2010).

A recent review of randomized-controlled trials testing methods to improve family engagement and retention in child mental health programs indicated brief interventions could improve engagement in the early sessions. These brief interventions often included providers explicitly addressing families' practical (e.g. schedules, transportation) and psychological (e.g. family members' resistance, beliefs about the treatment process) barriers as they entered treatment. Examples of these brief engagement interventions include; direct approaches to service engagement (e.g., appointment reminders, brief engagement interviews prior to treatment) or interventions where engagement was addressed indirectly (e.g., changes to the way in which families are invited to engage in intervention – group versus individual family treatment) (Ingoldsby, 2011).

Certain other interventions were found to produce positive long-term impact on engagement and retention (Ingoldsby, 2011). Although the format varied across the range of

effective treatment programs, in general, successful engagement methods were (a) individualized and addressed families' particular needs, concerns, and barriers; (b) intensive, addressing engagement at multiple time-points, with multiple family members, and in multiple ways as families progressed in treatment; (c) developed from a strong theoretical framework, and (d) integrated seamlessly into the underlying treatment or prevention program structure (Ingoldsby, 2011).

To accomplish this, the interventions often integrated motivational interviewing, family systems approaches, and enhanced family stress and coping support strategies at multiple points throughout treatment (Ingoldsby, 2011). Given the need for additional resources and the associated costs, it is likely not feasible to offer these ongoing, intensive, and personalized engagement interventions universally. This makes it important to better understand and identify which families are most in need of such interventions. Targeting and tailoring of programs to those children and families most at risk for dropout can lead to greater engagement and participation and improve the public health benefit of these programs (Ingoldsby, 2011).

In order to target programs most effectively, clear and consistent profiles of families likely to dropout from children's mental health services are required. This thesis facilitated this goal through the development of an improved definition dropout with the aim of identifying children/families most at risk. Treatment engagement programs could then target these individuals/families. Ideally, programs could also be tailored to influence predictors of dropout amenable to change through intervention.

1.4 Dropout and Children's Mental Health Services

A contemporary review suggests studies focused specifically on children make up only 1-2% of all research done on dropout from mental health services (Dierker, Nargiso, Wiseman, &

Hoff, 2001). Furthermore, studies on engagement and reducing dropout from children's mental health services remains scarce. Identification of predictors of dropout specific to children is an important prerequisite to such interventions. Studies specific to children's dropout from mental health services are important as children's access to, and use of services, are distinctly different from that of adults. Unlike adults, children do not seek or use services on their own. Instead, children tend to access services through the influence of their parents, teachers, juvenile justice authorities, and other adults (Stiffman, Pescosolido, & Cabassa, 2004); it is usually parents and caregivers who facilitate continued use. This makes studies of dropout from children's mental health unique, and particularly complex, as one must consider characteristics of the parent/caregiver, child, service provider and agency, as well as the combinations of these characteristics (Sirles, 1990).

Several studies have examined dropout specifically in child and adolescent outpatient settings (e.g., Armbruster & Fallon, 1994; Armbruster & Kazdin, 1994; Evenson et al., 1988; Gould, Shaffer, & Kaplan, 1985; Kazdin & Mazurick, 1994; McKay et al., 1996; Miller, Southam-Gerow, & Allin, 2008); no single variable appears to be sufficient to predict dropout from treatment. Many variables have been related to dropout, including; socioeconomic disadvantage, minority group status, single-parent household, the severity of the child's symptoms, the internalizing vs. externalizing nature of the child's disorder, parental stress, caregiver's mental status, caregiver's perception of treatment, perceived barriers to treatment, and therapist variables (Kazdin, Holland, Crowley, & Breton, 1997; Kazdin, Mazurick, & Bass, 1993; Luk et al., 2001; Pelkonen, Marttunen, Laippala, & Lönnqvist, 2000; Wierzbicki & Pekarik, 1993). However, many of these individual factors that have been associated with dropout are inconsistently found as significant predictors (Kazdin, Holland, & Crowley, 1997).

Researchers have suggested a number of features of the dropout predictor research that may contribute to this including a lack of theoretical basis underlying many studies of dropout from children's mental health, and the inconsistency of operational definitions of dropout used across studies. Relevant theoretical models related to dropout will be discussed, followed by a review of issues related to the definition of dropout.

1.5 Theoretical Models of Service Use and Dropout

A number of models relevant to dropout are discussed.

1.5.1 The Socio-Behavioural Model

The Socio-Behavioural model (Aday & Andersen, 1974) is a classic health service model. It allows for a broad conceptualization of dropout from children's mental health services as resulting from both the presence of pre-treatment factors, as well as some barriers that arise early in the service seeking process. Originally developed to understand adult health service use in the United States, this model posited three influences on service use: 1) *need factors* refer to a client's illness severity and can be measured through clinical status or subjective perceptions of one's own mental health (e.g., child diagnosis); 2) *predisposing factors* exist prior to illness onset and describe the propensity of individuals to use services (e.g., age, sex); 3) *enabling (or inhibiting) factors* are situational variables that describe one's means to use services and can act to facilitate or inhibit service-seeking, once need is perceived and a person intends to take action (e.g., socioeconomic status). The Socio-Behavioural Model was initially developed to *explain* health service use. Although, more often this model is interpreted as a *prediction* model (MacKian, Bedri, & Lovel, 2004). Explanatory modelling is used for testing causal explanations, whereas predictive modelling is used for predicting future observations given presented information (Shmueli, 2010). As suggested by Wang in regards to adult's mental health service

use, this model may also be applicable to predictors of adherence to or dropout from treatment (Wang, 2007).

1.5.2 Network-Episode Model

The socio-behavioral model has been adapted for use specifically with mental health care, and for children in the mental health sector by incorporating features of the family. These adapted models share common features of Andersen's Socio-Behavioural Model. One example, is the Network-Episode Model (NEM) (Costello, Pescosolido, Angold, & Burns, 1998; Pescosolido, Gardner, & Lubell, 1998) which emphasizes social networks and social action along with individual action in understanding the help-seeking process. The model suggests that pathways to mental health services are not fully explained by characteristics of the individual. Rather, the NEM focuses on the importance of outside social influence on when, how and if individuals receive care (Pescosolido et al., 1998). This social influence can operate as a part of the individual making an active choice to seek treatment, or caregivers, family members or others community members (e.g., police) may make the decision for the individual (Pescosolido et al., 1998).

This focus on the underlying social influence in service seeking does not replace a concern for understanding how different individual factors (i.e., predisposing demographic characteristics, enabling or need factors) affect service use. Rather, the NEM suggests that individual characteristics, like age, sex and socio-economic status, mark important limits on the kinds of social contacts that individuals are likely to have, which in turn affect service use (Pescosolido et al., 1998). For example, by setting limits on the emotional, informational and financial supports that an individual has access to in the community.

1.5.3 Gateway Providers Model

The Gateway Providers Model builds off the Network-Episode Model by incorporating decision theory (Slavic & Fischhaff, 1977) to clarify how service use can be understood as a series of rationally-based decisions (Stiffman et al., 2004). The Gateway Providers model draws insights from the NEM to understand which individual, treatment and social factors need to be explicitly considered in treatment decisions, whereas decision theory describes the process that begins with these factors and ends in the selection of a particular service (Stiffman et al., 2004).

The Gateway Providers Model focuses on three central influences that affect the treatment children receive. First, it incorporates the NEM concept of the key role of an outside individual, often not in the mental health system (e.g., parent, teacher), who initiates or directs the trajectory of service use (Stiffman et al., 2004). This person is referred to as the gateway provider. Second, it recognizes from Decision theory that the quality of advice, suggestions, assistance and referrals coming from the gateway providers are dependent on the information the gateway provider has and their understanding of the child's needs (Stiffman et al., 2004). Superior information and understanding on the part of the gateway provider can improve the quality of care offered to clients. Third, gateway providers' attitudes, perspectives and support can facilitate or hinder the implementation of new approaches in treatment systems (Stiffman et al., 2004).

Such a comprehensive, complex model is required to address the myriad influences affecting children access and use of mental health service. However, the size and complexity (i.e., the number of variables, with reciprocal interactions over time) of this model limit its application to specific studies.

1.5.4 Barriers to Treatment Model

Most studies focus on child or family and parent factors that are present prior to treatment and cannot be changed during treatment. For example, child sex, family socioeconomic status, and parental marital status. Some researchers (e.g., Kazdin, Holland, & Crowley, 1997; Nock & Ferriter, 2005) suggest the focus should shift to the processes and mechanisms underlying dropout, and factors that can be changed throughout treatment (e.g., treatment demands, the perceived relevance of the treatment and therapist relationship factors).

The barriers to treatment model was developed with the aim of focusing more attention on the mechanisms underlying dropout (Kazdin & Wassell, 2000; Owens et al., 2002; Todd, Deane, & Bragdon, 2003). This model proposes that families experience barriers during contact with mental health services for their child which contribute to dropout. Barriers are seen as acting in combination with commonly studied demographic (e.g., gender, ethnicity) and intake characteristics of the child (e.g., severity of child internalizing or externalizing problems) and the family (e.g., parent marital status, parental psychopathology) (Kazdin, Holland, & Crowley, 1997). The more barriers a family has, the greater the risk for dropout (Kazdin, Holland, & Crowley, 1997). Barriers include obstacles that contend with treatment participation (e.g., negative reactions to child's treatment from family or friends), treatment demands (e.g., treatment being too expensive when insurance coverage runs out), perceived relevance of treatment (e.g., the perception that treatment approach is inappropriate for child's problems), and the relationship with the therapist (e.g., the child not connecting with the therapist) (Kazdin, Holland, & Crowley, 1997). For families with a high risk for dropping out based on demographic or intake characteristics (e.g., low socio-economic status), fewer barriers are seen as protective factors, attenuating the risk of dropout (Kazdin, Holland, & Crowley, 1997).

1.6 Choosing the Appropriate Model

There are a number of different models which have been developed for and applied to dropout from adult and children's health services. The theoretical model chosen depends on the purpose of the study. Some models aid in overall predictive conceptualizations of factors contributing to dropout, whereas others focus on tangible explanatory mechanisms of dropout. For the purposes of the current studies, we are more concerned with the prediction of dropout, and are not aiming to propose specific mechanisms of dropout.

There are benefits to studying the underlying mechanisms of dropout (e.g., suggests clear foci for intervention). When using a process model, some variables are present at intake; however, majority of variables only appear as barriers throughout the course of treatment. Unfortunately, it is difficult to assess barriers at every session in routine community care to make use of these process models. This limits the usefulness of the resulting predictor data for applications to engagement interventions. For this reason, the Socio-Behavioural model, which is parsimonious and focused on variables already available to community agencies at intake, is used in this thesis. Predictors of dropout can be used to target engagement interventions (Ingoldsby, 2011) to families upon initial intake in services. That is, if we can identify individuals at intake who are most likely to dropout, only these individuals would need to receive pretreatment interventions designed to decrease dropout.

The NEM, Gateway Providers model, and the Barriers to Treatment model do not share the same parsimony as the classic Socio-Behavioural model. Further, there are practical limits in terms of having data available to test these more complex models. The studies presented in this thesis use data from a previously conducted study on children's patterns of mental health service. The data available includes basic information routinely collected at intake in community mental

health agencies and available at the initial appointment to aid in prediction of later dropout. Thus, the Socio-Behavioural model will be used throughout this thesis to understanding factors contributing to dropout.

1.7 Definitions of Dropout

The varied findings in studies seeking to characterize dropouts may be explained in part by their methodological differences (Armbruster & Kazdin, 1994). Importantly, these differences include variations in the operational definition of dropout used across studies. Dropout has been defined in primarily two different ways. First, dropout has been defined as ceasing treatment before a set number of sessions, or a specified "dose" of treatment is completed (Johnson, Mellor, & Brann, 2008). Second, dropout has also been defined as termination of treatment against clinician judgment (Wierzbicki & Pekarik, 1993). A recent study examining differences in classification and predictors across definitions of dropout highlights issues related to defining dropout.

In 2012, Warnick and colleagues conducted a study comparing different definitions of dropout used on the same group of individuals and found differences in predictors of dropout depending on the definition used. Families (N=1098) receiving services for children aged 5 through 18 at an urban outpatient mental health clinic in the U.S. were studied with respect to three different definitions of dropout: dose, clinician judgment and the child missing their final scheduled appointment (Warnick, Gonzalez, Robin Weersing, Scahill, & Woolston, 2012). [The missed last appointment definition, is considered to be an overly conservative view of dropout and is not commonly used in the dropout literature (Wierzbicki & Pekarik, 1993)]. Furthermore, a number of variables predicted dropout by only one definition; lower socio-economic status (i.e., receiving state-funded low-income insurance support) predicted dropout by the missed last

appointment definition; having low caregiver-reported youth functioning predicted dropout by the clinician judgement definition; and living with a non-biological family, routine intakes (as compared to urgent intakes), and longer wait times predicted dropout by the dose definition.

The underlying assumption in research in this area is that there are important differences between clients who drop out and those who complete treatment. Ideally, if a definition is appropriately categorizing individuals as homogenous groups of dropouts or completers, distinct and replicable differences will be found between these two groups. The difficulty in finding consistent estimates of dropout prevalence or replicable differences between dropouts and completers suggests current definitions of dropout are categorizing individuals inconsistently and possibly incorrectly (Pekarik, 1985).

1.8 Issues with Current Definitions of Dropout

The dose definition of dropout, - ceasing treatment before a specified amount of treatment is completed (Johnson et al., 2008) - is typically used in randomized controlled trials (RCTs). This definition provides a useful objective standard for defining dropout. However, this definition may be inappropriate for use in community mental health agencies, where evidence based treatments (EBTs) are not consistently offered, clients display a heterogeneous mix of diagnoses and often have comorbid issues which may require longer or more complex treatments (Schoenwald & Hoagwood, 2001).

The "clinician judgement" definition of dropout - termination of treatment against clinician judgment (Wierzbicki & Pekarik, 1993) – also has potential problems. Clinician's may use different criteria for judging the appropriateness of termination (Wierzbicki & Pekarik, 1993). Some clinicians may base their judgement on specific symptom improvement, while other clinicians may look for changes in overall functioning. As well, clinicians and clients may have

differing assumptions about treatment goals and expectations (Garfield, 1994). Clinicians may seek to have clinically significant change while families may instead aim for partial reduction in problem severity such that the child's problems can be managed successfully at home without further treatment.

Both the dose and clinician judgment definitions of dropout rely, to some degree, on the amount of time (typically reflected in the number of sessions rather than duration of time) an individual has been in treatment to determine if an individual is considered to have dropped out. However, treatment duration may not be directly related to dropout (Pekarik, 1985). Inappropriate termination can occur at any time, including the late stages of treatment, or appropriate termination of treatment may occur after a few sessions. For example, some patients, although terminating treatment earlier than a set number of sessions, can still be considered appropriate terminators, if sufficient improvement in their mental health was achieved in a shorter than planned duration. Therefore, not all "premature" terminators may represent dropout. Grouping individuals based on a specific number of sessions attended would obscure differences between dropouts and completers who might require differing amounts of treatment. There are also likely fundamentally different reasons for individuals dropping out after a single session in comparison to dropping out after a year of treatment. For these reasons, categorizing treatment participants by a dose or clinical judgment definition may result in a dropout group comprised of a mixture of dropouts and appropriate terminations (Johnson et al., 2008). This signifies that definitions should take more than treatment duration into account when categorizing individuals based on dropout status.

Incorporating "need" into a definition of dropout may resolve some of the above issues with previously used definitions. Need is used to refer to the nature and severity of the child's

problem as well as the family and caregiver context of that problem (further discussed in subsection 1.9). Need is also related to the differences between clinician and client perspectives on treatment outcomes and dropout. Clinicians may seek to have clinically significant change, while families may instead aim for an outcome that is good enough for them to manage at home. What constitutes good enough may depend both on the severity of the child's problem at intake as well as the family's coping ability. By failing to take an individual's need for treatment into account, both a dose and clinician judgment definition may create heterogeneous groups of dropouts.

1.9 Development of a Need-Based Definition of Dropout

The underlying assumption in dropout research is that there are important differences between clients who drop out and those who complete treatment. Ideally, if a definition is accurately categorizing individuals as homogenous groups of dropouts or completers, distinct and replicable differences will be found between those classified in each group. Unfortunately, existing definitions of dropout do not appear to adequately categorize dropouts and completers as homogenous groups. Neither a dose nor clinician judgment definition of dropout takes the nature and severity of the client's problem, as well as the family and caregiver context of that problem into account. There is significant evidence that problem severity impacts continued service use.

Firstly, higher levels of child symptom severity have been consistently associated with higher frequency of service use in community-based children's mental health samples (Farmer, Stangl, Burns, & Costello, 1999; Sayal, 2004). One explanation for this association (Nock & Ferriter, 2005) is that different parent, child and treatment factors, such as need, likely impact the relation between treatment dose and therapeutic response. For example, stepped-care treatment models rely on the idea that families with less severe problems may benefit sufficiently from

smaller doses of therapy whereas those with more severe problems may require larger doses to experience adequate improvement (Haaga, 2000). For this reason, in a stepped-care model, the least intensive intervention option is provided first, more intensive services are only offered as required to achieve treatment goals (Haaga, 2000). Supporting this notion, there is evidence to suggest severity of the child (Ruma, Burke, & Thompson, 1996) and parent psychopathology (Cobham, Dadds, & Spence, 1998; Dumas & Wahler, 1983) are negatively correlated with treatment responsiveness. Relatedly, various clinical syndromes may require different types of treatment at varying doses, depending on the severity and persistence of symptoms (Hansen & Lambert, 2003). For example, in a population of adults, researchers have compared the differential response rates of symptom types to therapy doses and results showed that different symptoms (e.g. acute vs. chronic) improved at different rates, requiring a different number of sessions to reach a 50% response rate (Kopta, Howard, Lowry, & Beutler, 1994). Thus, researchers have suggested that in analyzing the relationship between treatment dose and outcome, it may be particularly important to consider the initial severity of childhood psychopathology and the presence of parental psychopathology as potential influences on treatment efficacy (Nock & Ferriter, 2005). Finally, need has also been related to dropout from services. Perhaps due to differences in required dose and treatment responsiveness, individuals with higher levels of need also tend to be more likely to dropout from mental health treatment (Kazdin, Mazurick, & Siegel, 1994). This may be especially likely in a stepped-care model where low intensity services offered first may not have positive impacts for children with severe problems and these higher need children may dropout before being shifted to higher intensity services.

Given the clear impact of the nature and severity of the child's problem, as well as the family and caregiver context of that problem - hereafter referred to as need - on both service use and dropout from services noted above, we propose that an improved definition of dropout should recognize need. This novel needs-based definition recognizes that children differ in their need for treatment at intake and that this should influence the point at which a child might be categorized as having dropped out or completed treatment.

1.10 Summary

In this thesis, two studies were conducted. Both are based on secondary analyses of data from a previous study (Reid et al., 2010). The first of the two studies outlines the development and initial use of a novel need-based definition of dropout from children mental health services. A need-based definition suggests the optimal number of sessions required for treatment completion should vary based on a client's level of need at intake. Dropout would then be defined as receiving significantly lower than the optimal number of sessions. The two-step process for developing a need-based definition of dropout is presented; (a) defining problem severity at intake and (b) determining number of treatment sessions required based on need. In this first study this definition is compared to other commonly used definitions of dropout, dose and clinician judgement. The results of this study suggest how various definitions categorize the same individuals, where definitions overlap and what characteristics distinguish those who meet multiple definitions of dropout from those who meet no definitions of dropout.

The second study examined the predictors of dropout using the novel need-based definition. These predictors will be compared to predictors of dropout with a dose and clinician judgement definition on the same sample, as well as findings from previous reviews of the dropout literature. Both studies will discuss the merits and potential uses of this novel need-

based definition to improve our ability to accurately capture children who drop out of mental health services.

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Chapter 2

Defining Dropout from Children's Mental Health Services:

A Novel Need-Based Definition of Dropout

Kimberly Williams Dossett

2.1 Dropout from Children's Mental Health Services

Estimates suggest 20% of children (ages 5-18) have mental health problems, but only 5% receive mental health services (Rae-Grant, Thomas, Offord, & Boyle, 1989; Zachrisson, Rödje, & Mykletun, 2006). Unfortunately, even of those children who receive treatment, 28% to 88% terminate treatment prematurely (i.e., dropout) (Lai, Pang, Wong, Lum, & Lo, 1998; Luk et al., 2001; Warnick, Gonzalez, Robin Weersing, Scahill, & Woolston, 2012). Compared to children who complete treatment, those who drop out are more likely to experience persistence of symptoms, engage in delinquent activities, abuse substances, fail to graduate from high school and be unemployed (de Haan, Boon, de Jong, Hoeve, & Vermeiren, 2013). In addition, dropout creates inefficiencies for community mental health agencies. It poses a financial burden in terms of staffing costs, contributes to long waiting times for services, negatively influences the community perception of the agency, and limits the number of people an agency can serve (Klein, Stone, Hicks, & Pritchard, 2003; Tantam & Klerman, 1979). For these reasons, the characteristics of children who drop out of mental health treatment and the conditions under which dropout appears have been researched widely (e.g., Armbruster & Fallon, 1994; Armbruster & Kazdin, 1994; Gould, Schaffer, & Kaplan, 1985; Kazdin, Mazurick, & Siegel, 1994; Miller, Southam-Gerow, & Allin, 2008). However, no consistent profile of children who drop out has emerged (Armbruster & Kazdin, 1994). One issue that may be contributing to this inconsistency is variability in definitions of dropout. Thus, the goal of this study is to propose a novel definition of dropout, which could increase our understanding of the factors that predict dropout.

2.2 Methodological Issues in the Dropout Literature

2.2.1 Inconsistencies in Definitions of Dropout

Researchers have theorized that the discrepancies in predictors of dropout may occur because no single factor is a necessary or sufficient condition for dropout, but rather certain factors in the context of other factors can altogether lead to dropout (Warnick et al., 2012). This is likely contributing to the inconsistencies found. However, there is evidence that a second issue is also playing a role. As suggested by Warnick and colleagues (2012), observed predictors of dropout vary with the definition of dropout used in the study (Armbruster & Fallon, 1994; Issakidis & Andrews, 2004; Kazdin, Holland, & Crowley, 1997; Wierzbicki & Pekarik, 1993). Dropout has been defined in two different ways in the literature: number of sessions attended and clinician judgment.

First, studies have defined dropout using number of sessions attended as the criterion - children attending less than the specified number of sessions are categorized as dropouts. This can be thought of as a "dose" definition, and is often used in efficacy studies and in the context of evidence-based treatments (EBT) where there are a specified number of sessions to be completed (de Haan et al., 2013; Johnson, Mellor, & Brann, 2008). The necessary number of sessions may be set arbitrarily (e.g. using a median split) or set in regards to a specific EBT protocol. As a result, the necessary number of sessions differs across studies (Johnson et al., 2008). In 2013, de Haan and colleagues published a meta-analytic review of predictors of dropout from child and adolescent therapy since 1994, taking the definition of dropout (i.e., dose vs. clinician judgement) and study design (i.e., efficacy vs. effectiveness) into account. This review suggested there are a variety of differing criteria for dropout even within a dose definition. These criteria can be conceptualized as differing based on whether the study is

oriented towards effectiveness or efficacy. In effectiveness studies, the criteria for defining dropout is generally a simple number of sessions, whereas in efficacy studies it is usually thought of as a percentage of the expected protocol. There is considerable variability across studies using these two different approaches of defining dropout in terms of number or percentage of sessions attended. For example, effectiveness studies have categorized dropout as attending only the first appointment (McCabe, 2002; Miller et al., 2008), fewer than four sessions (Friars & Mellor, 2007) or fewer than 21 sessions (Baruch, Fearon, & Varouva, 2009; Baruch, Gerber, & Fearon, 1998). The dose definition of dropout has been categorized in efficacy studies as attending less than 50% of the intended sessions (Peters, Calam, & Harrington, 2005), less than 80% (Lock, Couturier, Bryson, & Agras, 2006) or less than 100% of the intended sessions (Prinz & Miller, 1994). Though dose definitions provides a useful objective standard for defining dropout, this approach to defining dropout is likely inappropriate for use in community mental health agencies, where EBTs are not consistently offered, clients display a heterogeneous mix of diagnoses and often have comorbid problems which may lengthen the number of treatment sessions (Schoenwald & Hoagwood, 2001).

Second, dropout has been defined using the clinician's judgment of the appropriateness of termination as the criterion (Wierzbicki & Pekarik, 1993). Generally, this implies a unilateral decision made by the parent, child/youth, and/or family to terminate treatment, against the advice of the clinician (de Haan et al., 2013). Similar to the dose definition, de Haan and colleagues (2013) reviewed studies with a variety of criteria for dropout within this clinician judgement definition. By a clinician judgment definition, dropout can be noted to occur when the child fails to attend their scheduled sessions or has repeated cancelations resulting in no further contact with the agency (Armbruster & Fallon, 1994), the family openly refuses recommendations for further

treatment (Kazdin, Holland, & Crowley, 1997), treatment does not continue after the evaluation/assessment phase, or the key problems have not been "worked through" and need for care is still evident to the clinician (Pelkonen, Marttunen, Laippala, & Lönnqvist, 2000). On the other hand, treatment can be considered complete when problems have been resolved, the treatment regime, as determined by the clinician, is completed, and/or both the therapist and family agree about termination (Kazdin, Holland, & Crowley, 1997; Pekarik, 1985). Though a clinician judgment definition of dropout has face validity - the concept of dropout means that treatment is terminated prematurely (Johnson et al., 2008) - clinicians may use different criteria for judging the appropriateness of termination (Wierzbicki & Pekarik, 1993). Some clinicians may base their judgement on specific symptom improvement, while other clinicians may look for changes in overall functioning. As well, clinicians and clients may have differing assumptions about treatment goals and expectations (Garfield, 1994). For example, the client may end treatment because "enough" relief has been obtained, even if the criteria for "clinical improvement" or recovery have not been met (Hynan, 1990; McKenna & Todd, 1997; Todd, Deane, & Bragdon, 2003). A clinician may view this as dropout, if s/he believes that clients should achieve symptom resolution prior to ending treatment.

Both the dose and clinician judgment definitions rely, to some degree, on the duration of treatment (typically reflected in the number of sessions rather than duration of time). However, treatment duration may not be directly related to dropout (Pekarik, 1985). There will be fundamentally different reasons for individuals dropping out after a single session, in comparison to dropping out after a year of continuous treatment. Premature termination can occur at any time, including the late stages of treatment. Alternatively, some clients although terminating treatment earlier than a set number of sessions, can still be considered appropriate terminators if

sufficient improvement in their mental health was achieved in a shorter than planned duration. For these reasons, categorizing treatment participants by a dose or clinical judgment definition, which relies primarily on number of sessions attended, may result in a dropout group comprised of a mixture of dropouts and appropriate terminations. Grouping individuals this way would make it difficult to find consistent estimates of dropout prevalence or replicable differences between dropouts and completers (Johnson et al., 2008).

In order to understand the ways in which differences in operational definitions of dropout can impact prevalence rates of dropout, Warnick and colleagues (2012), conducted a study comparing three different definitions used on the same group of individuals; 1098 families receiving services for children aged 5 through 18 at an urban outpatient mental health clinic in the United States. Rates of dropout varied substantially depending on how dropout was defined. Three different definitions of dropout were examined: dose, clinician judgment and a definition related to the child missing their final scheduled appointment. Overall, 39% of youth were considered treatment dropouts according to all three definitions, while 96% of the sample was coded as dropping out by at least one definition. Clinician judgment and the "missed last appointment" definition resulted in similar rates of dropout (63.1% and 56.6% respectively); the dose definition resulted in a higher dropout rate (88.1%). The missed last appointment definition is considered to be an overly conservative view of dropout and is not commonly used in the dropout literature (Wierzbicki & Pekarik, 1993).

2.2.2 Modelling Dropout Based on Number of Sessions

There is a wide range of prevalence rates for dropout in children's mental health services, some as high as 88% of clients categorized as dropouts (Warnick et al., 2012). However, it seems unlikely that 88% of clients treated are not improving prior to terminating treatment. In support

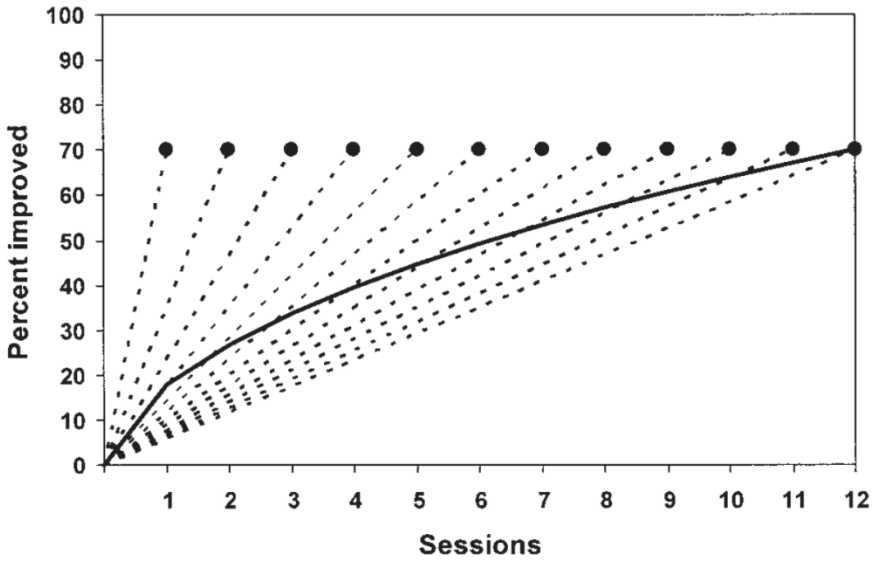
of this, data from children and youth seen in Child and Adolescent Mental Health Services (CAMHS) agencies from across Ontario (Barwick & Vlad, 2015) suggests that majority of clients for whom the Child and Adolescent Functioning Scale (CAFAS) was completed are vastly improved prior to leaving services according to this objective measure. Data from this 10-year retrospective report on children aged 6-17 attending service providers across Ontario, suggests that 75% of children show absolute improvement in functioning (Barwick & Vlad, 2015). There are limitations to these data however. The CAFAS "baseline" is administered after approximately three months of services; thus, children receiving less than about three months of service would not have been included in the analysis. Nonetheless, it objectively implies a sizeable portion of clients should be considered completing sufficient amounts of treatment to achieve clinical improvement. This goes against the notion, suggested by dropout percentages as high as 88%, that only a very small proportion of clients are benefitting sufficiently from treatment. Thus, such high dropout rates are difficult to rectify without accepting that the focus purely on the number of sessions attended to determine if dropout has occurred is insufficient. It is likely that the number of sessions needed to achieve meaningful improvement varies depending on the nature and severity of the child's presenting problem and/or contextual factors which may impact treatment success (e.g., parental educational attainment, single vs. two-parent families).

The inadequacy of understanding treatment outcome purely based on number of sessions attended has been modelled using data from adults receiving treatment at primary care counselling or psychotherapy sites in the United Kingdom (Barkham et al., 2006). Traditionally, a negatively accelerating dose-effect relationship has been accepted between session attendance and psychotherapy effect. This means that for every additional session an individual attends, they

derive less benefit than the sessions prior. More recently, an alternative a good enough level (GEL) model has been suggested (see Figure 2.1; Barkham et al., 1996, 2006). Initially, Barkham and colleagues (2006) observed that session-by session plots of improvement for up to 16 sessions tended to look more or less linear; this finding was in contrast to previous findings. They also noted that in most of these dose-effect studies clients had varying lengths of treatment. Thus, different aggregations of clients were represented at each successive point, which might explain the finding of a negatively accelerating curve. Barkham and colleagues suggest that problems might be assumed to improve at a steady (i.e., linear) rate across sessions until it reaches a GEL; at this point, therapy is discontinued. The rate of improvement might vary depending on the characteristics of the problem (e.g., acute distress vs. personality issues), characteristics of the client (e.g., personal resources, external stressors), or characteristics of the treatment (e.g., limitation to a greater or lesser number of sessions), and as a consequence, different problems would take different numbers of sessions to reach their GEL. Thus, the authors suggest that although the response of specific symptoms may be linear, "averaging across multiple clients or multiple problems would yield a negatively accelerated curve, as clients with more quickly responding problems dropped out of treatment" (Barkham et al., 1996).

We do not currently have data similar to those by Barkham and colleagues for children's mental health service. However, it is reasonable to assume that similar phenomena would occur with CAMHS. Currently, our understanding of dropout from youth mental health is limited by the inconsistency in operational definitions used across studies. Furthermore, current definitions seem to be inadequate given their focus on the amount of time/number of sessions an individual has been in treatment, while a focus on characteristics of the client, problem and treatment circumstance is indicated.

Figure 2.1. Good Enough Level Model. From Barkham et al., 2006, "The endpoints of the dotted lines represent the assumed constant percentage (70%) of clients meeting improvement criteria for groups who attended 1 to 12 sessions. The dotted lines represent interpolated percentages at intermediate points. The solid line represents the percentage of clients remaining in therapy at each session who met the criteria, calculated as the average of the interpolated percentages for clients remaining in treatment at each session."



2.2.3 Early and Late Dropout

The inadequacy of a definition of dropout based on a particular number of sessions, and the heterogeneity of individuals who terminate treatment at different time points has been recognized as an issue in the dropout literature. Beginning with Kazdin and Mazurick (1994), researchers have theorized a difference between individuals who drop out out in the early stages (e.g., failure to return after initial assessment, 2 or fewer sessions, 5 or fewer sessions, 6 or fewer sessions, fewer than median of 8 sessions) and late stages (e.g., unilateral termination after returning at least once following initial assessment, termination after 6 or more sessions, termination after 7-14 session, termination after median of 8 sessions) of treatment.

Characteristics of individuals who terminate treatment may vary as a function of the time point at which they terminate. Referring to all such individuals as dropouts may mask reliable differences and impede understanding of what is needed at different time points in treatment to engage and retain children and their families (Kazdin & Mazurick, 1994). Although, one study which compared early and late dropouts (used median spilt; early dropout: 5 sessions or less, late dropout: 6 sessions or more) found no differences between the two groups (Garcia & Weisz, 2002). The seminal study (Kazdin & Mazurick, 1994), and numerous works extending on this idea (Gonzalez, Weersing, Warnick, Scahill, & Woolston, 2011; Pelkonen et al., 2000; Sirles, 1990) have confirmed that in a variety of samples, subgroups of dropouts (based on time of dropout; early or late) can be identified and that different factors relate to their risk for dropping out. This study and others found that certain predictors became significant when looking at subsamples of early and late dropout, that were not significant when combining all individuals using a pure clinician judgement definition (Gonzalez et al., 2011).

However, Kazdin and Mazurick (1994), confirm that studies that combine all individuals can still likely identify some reliable differences even when subgroups are ignored. The suggestion from this body of work was that, the issue in the dropout literature may not specifically be delineating subsamples. Rather, developing a conceptual scheme and more finely grained understanding and analysis of the heterogeneity of individuals who drop out and the salient influences on the dropout process, at the points they are most likely to assume significance.

2.3 A Need-Based Definition of Dropout

Neither a dose nor clinician judgment definition of dropout takes the nature of the client's problem, as well as the context of that problem into account. In a population of adults receiving

community based individual psychotherapy, researchers have compared the differential response rates of symptom types to therapy doses and results showed that different symptoms (e.g., acute vs. chronic) improved at different rates, requiring a different number of sessions to reach a 50% response rate (Kopta, Howard, Lowry, & Beutler, 1994). Thus, different clinical syndromes may require different types of treatment at varying doses, depending on the severity and persistence of symptoms (Hansen & Lambert, 2003). Furthermore, a positive association has been found between higher levels of need (i.e., child symptom severity) and greater children's mental health service use in community-based samples (Farmer, Stangl, Burns, & Costello, 1999; Sayal, 2004). However, individuals with higher levels of need also tend to be more likely to dropout from mental health treatment (Kazdin et al., 1994); it should be noted that Kazdin's review did not consider the issue of variation in need for treatment with respect to the definition of dropout.

Given the issues noted above, we propose that a definition of dropout must recognize the individual differences in problem presentation and context – hereafter referred to as need for treatment. A need-based definition suggests the optimal number of sessions required should vary based on a client's symptom severity at intake as well as the family and caregiver context of that problem. The optimal number of sessions would be determined to be the average number of sessions received by individuals with a similar level of need at intake, and positive outcomes following completion of treatment. Dropout would then be defined as receiving significantly lower than the optimal number of sessions.

2.4 Objectives

The overall aim of this study is to describe the development of a novel definition of dropout applicable to community-based children's mental health agencies.

Objective 1: Determine the prevalence rates of dropout according to three definitions: (a) dose, (b) clinical judgment and (c) level of need.

Objective 2: Compare the characteristics of children and their families, and the treatment received who meet one or more definitions of dropout. Characteristics of children and their families includes: child age, child sex, child problem severity, child risk behaviors, child functioning/impairment, parental marital status, number of household members, involvement with CAS, caregiver needs and strengths, care intensity and organization. Treatment received includes: number of sessions, duration of treatment and intensity of services received.

2.5 Methods

Secondary data analyses were conducted using data from a larger study on patterns of service use across Ontario children's mental health agencies (Reid et al., 2010). The methodology and key findings from the principal study will be described first, followed by methods for the current analyses.

2.5.1 Principal Study

Administrative data were obtained from five children's mental health agencies that: (a) provided services for children aged 5-18 years old, and (b) were accredited by Children's Mental Health Ontario or a similar body. Inclusion criteria for children were: (a) between the ages of 5 and 13 years at their first visit, (b) first visit occurred between 2004 and 2006, and (c) at least one in-person visit. Children with a pervasive developmental disorder (e.g., autism) or who were seen in a service specializing in developmental disorders were excluded. [The principal study focused on understanding services use over extended periods of time for conditions not already assumed to require on-going care.] Visit data obtained included date and nature of contact (e.g., case management, outpatient visit, residential care). Measures of child and family functioning

(i.e. the Brief Child and Family Phone Interview and the Child and Adolescent Functional Assessment Scale) were also obtained.

Patterns of Service Use. Multi-level latent class cluster analysis (Vermunt & Magidson, 2002) of children's visit data was performed. Five distinct patterns of service use were identified and labeled as: Minimal (53% of children), Brief-Episodic (8%), Acute (20%), Intensive (13%), Intensive-Episodic (6%). Children's service use within each cluster was described in terms of number visits and duration of involvement within specific episodes of care (EoC; see Table 2.1). A minimum of three visits marks the beginning of an EoC, and a free period of 180 days without a visit signifies the end of an EoC (Reid et al., 2015).

Table 2.1.

Summary of patterns of service use across five children's mental health agencies

Pattern	N	% of all clients	Two or more episodes	Duration involvement (years)	Mean visits (over 4 years)
Minimal	2997	53%	2%	0.4	3
Brief-Episodic	447	8%	71%	3.5	29
Acute	1131	20%	4%	0.8	16
Intensive	730	13%	27%	1.8	33
Intensive-Episodic	327	6%	46%	3.3	87

Note: N= 5632 (Table from Reid et al., 2010)

Chart Reviews. Chart reviews were conducted for a stratified [age (5 to 9; 10 to 13), and sex] random sample of the target client population within each agency (n=125) within each of the five patterns of service use (N=625). Qualified research assistants reviewed charts for each of the selected clients on site at the mental health agency. Chart reviews were completed at intake (i.e., first face-to-face visit during the study period) and at the end of each EoC. Basic

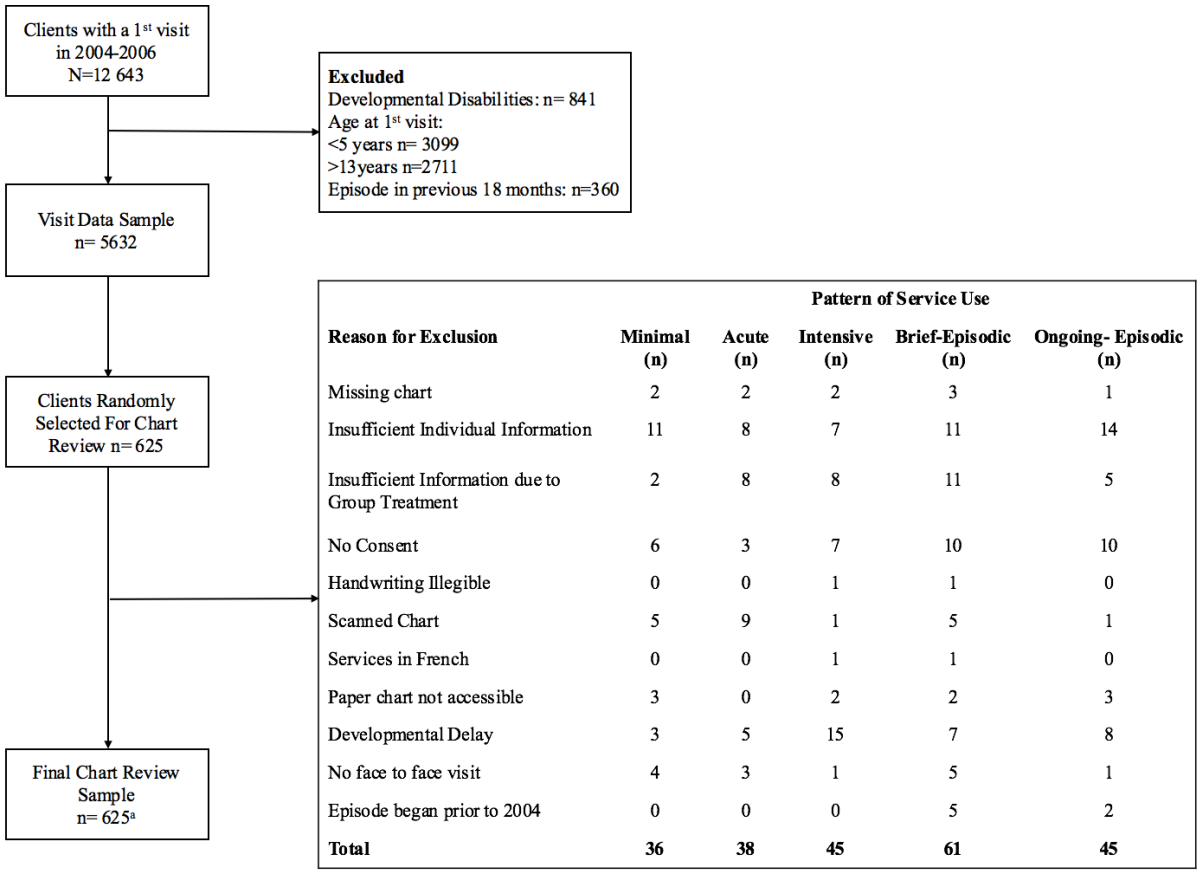
demographic information was recorded and the level of functioning was coded using the Child and Adolescent Needs and Strengths (CANS) scale (Lyons, 1999) at the start and end of each EoC. Treatment disposition at the end of each episode of care was also coded. If a chart was unable to be reviewed, (e.g., the chart could not be located, or it contained insufficient individual data to complete a Child and Adolescent Needs and Strengths (CANS; Lyons, Rawal, Yeh, Leon, & Tracy, 2002) rating) another chart from the same pattern of service use was chosen for review. Figure 2.2 presents a flow diagram for the chart review data collection.

At minimum, chart reviews were completed at intake (i.e., first face-to-face visit during the study period) and where appropriate, at the end of each episode of care (EoC). Chart review ratings were made using all the information available within a specified number of sessions or number of months (see below). Chart reviews were completed at the start and end of each episode of care. When making ratings about caregivers, ideally, the caregiver(s) with whom the child is currently living were rated. If the child is not with long-term caregivers (e.g., foster care, residential treatment centre), then ratings focused on the caregiver to whom the child would be returned. If it was a long term placement, then the current caregiver was rated.

All four research assistants were trained with standardized on-line training for the CANS (Praed, 2011) and trained by an experienced coder prior to beginning the actual chart reviews. Inter-rater reliability was calculated on an ongoing basis. Approximately every fourth chart (27% of the sample) was reviewed by two or more research assistants to determine inter-rater reliability. For these charts, any discrepancies were discussed and a consensus was reached to make the final rating. Inter-rater reliability for the intake and discharge CANS ratings for 170 chart reviews (containing 0 to 3 EoC) was calculated by analyzing the consistency of ratings for individual CANS items. This was achieved by calculating a two-way mixed model intra-class

correlation coefficient (ICC) with measures of absolute agreement (Shrout & Fleiss, 1979): ICC (2,4)=0.84. Percent agreement on non-CANS items in the chart review was 95.6% and overall percent exact agreement was 92.1%.

Figure 2.2. Flow diagram of the chart review data collection.



	Pattern of Service Use				
Reason for Exclusion	**Minimal (n)**	**Acute (n)**	**Intensive (n)**	**Brief-Episodic (n)**	**Ongoing- Episodic (n)**
Missing chart	2	2	2	3	1
Insufficient Individual Information	11	8	7	11	14
Insufficient Information due to Group Treatment	2	8	8	11	5
No Consent	6	3	7	10	10
Handwriting Illegible	0	0	1	1	0
Scanned Chart	5	9	1	5	1
Services in French	0	0	1	1	0
Paper chart not accessible	3	0	2	2	3
Developmental Delay	3	5	15	7	8
No face to face visit	4	3	1	5	1
Episode began prior to 2004	0	0	0	5	2
Total	**36**	**38**	**45**	**61**	**45**

Note: No consent = individual consent for participation was not required for the study as a whole; however, if some clients had explicit, documented refusal to allow chart reviews for any reason (e.g., accreditation). In these cases, chart reviews were not conducted.
[a]Excluded charts were resampled.

2.5.2 The Current Study

The status of client at the end of his/her care (i.e., disposition at discharge) was used to determine dropout status. Thus, only data from the chart review subsample (N=625) was used in the current study.

Sample

Children were aged 5-13 years (mean age= 9.4, SD=2.5) at intake; 62.2% were male. At intake, the majority of children (60.9%) had parents who were married, common law or living together, on average, each family had a total of 4.1 household members, and the majority of children had no involvement with CAS at intake (64.2%).

Measures/Variables

Only measures and variables utilized in the current study are presented.

Predictor Variables

Demographics

Demographic variables collected included: age, sex, primary caregiver marital status (i.e., single parent, married, common-law, other, unknown), total number of household members and involvement with child welfare – the Children's Aid Society (CAS). CAS involvement was coded as: (a) no involvement, (b) investigation only (i.e., family has been investigated for reports of child abuse or neglect though no further services were provided), (b) some involvement (i.e., services were provided to a family who voluntarily participates, children remain in the home) (c) temporary care (i.e., children were placed in short-term foster or group homes), supervision (i.e., services are mandated for the family, children remain in the home), Crown Ward (i.e., child is placed under the protection of a legal guardian and is a legal responsibility of the government).

Variables used to compute outcome variables

Two variables were used to compute various definitions of dropout (see 2.6.2 Operational Definitions of Dropout, below).

Mental health service use

Visit data were abstracted such that only face-to-face visits were included. For the purposes of this study, a "treatment" session was defined to include all forms of contact with the agency as each may improve patient's outcomes, whether the purpose of the contact is to treat the presenting problem in the individual or it is a service delivered as part of the agencies care for the entire child/family. This includes visits coded (Ministry of Children and Youth Services, 2010) by the primary study as an "Outpatient Visit" (i.e., drop-in resources, brief therapy, evidence-based interventions, family, group or individual counselling, or other targeted interventions), "Emergency Response" (i.e., crisis intervention or counselling, mobile crisis services, trauma crisis stabilization), "Residential Service" (i.e., hospital-based inpatient services), "Intensive Service" (i.e., foster care or wraparound services), "Day Treatment" (i.e., special education, counselling, parent training, vocational training, skill building, recreational therapy - usually lasting at least four hours a day), "Assessment" (i.e., diagnosis, intake or specialized assessments), "Respite Service" (i.e., both in and out of home services providing temporary support and relief to families and caregivers of children with mental health problems) and "Service Coordination" (i.e., case management, case conferencing and multi-professional team meetings).

To facilitate description of the nature of services received, each session was categorized as either low, medium, or high intensity. Appendix A provides a detailed description of various combinations of types of services that were used to categorize children into either low, medium, or high intensity of service use. Generally, services that restricted the child's daily functioning and included family involvement were deemed as more intensive. Children who received mainly drop-in counseling services, group therapy, or brief therapy were categorized as low intensity. Parent training was also considered low intensity. High intensity of service use was categorized

by services that remove the child from the home for a significant period of time, such as residential care (Farmer et al., 1999; Hodges, Doucette-Gates, & Kim, 2000). All other services were categorized as medium intensity.

It was possible for children to have a mix of service intensity types. Thus, the percentage of low, medium or high intensity sessions was computed based on the total number of sessions. The intensity category with the highest percentage of sessions was used to determine overall service use intensity (see Appendix B). If a child had equal percentages of more than one intensity, then the highest intensity was used to determine overall service use intensity.

Disposition at Discharge

Disposition at the time of the client's last visit, at the end of an EoC (or end of involvement if the child did not have sufficient visits in the correct time frame for an EoC) was coded using all available information in the patient's file. Disposition at discharge was coded as "Family dropped out" if the family did not attend the scheduled appointment and then did not return telephone calls to rebook. In some cases, a telephone contact did occur at some point after a missed appointment and the parent may have stated a reason for dropping out (e.g., that he/she felt services were no longer needed) which was also coded. Other coding options included: "Family moved", "Refused treatment", "Treatment received and refused additional treatment", "Completed treatment" (i.e., child/family completed treatment as mutually agreed upon with service provider, usually stated in discharge report), "Referred elsewhere for treatment", or "Treatment ongoing" (i.e., additional visits after four-year study period).

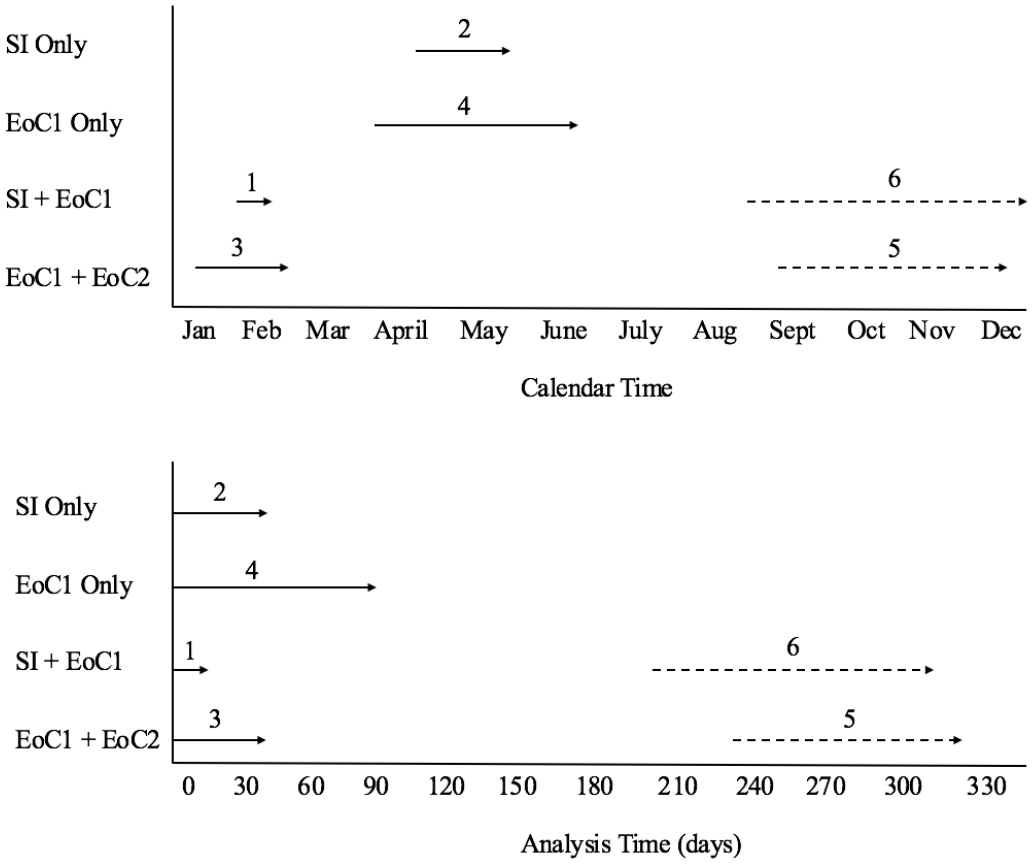
For the purposes of this study, the disposition at discharge coding from the end of the first EoC was used if clients had more than one EoC. In cases where the patient had less than 3 visits in 180 days (i.e., did not have a full EoC), dropout was based on disposition at their last

visit. These were referred to as the Start of Involvement (SI). Visits and dispositions at discharge coded following the first EoC (i.e., visits following a gap of more than 180 days without visits) were not analyzed. For an illustration of these distributions of visits see Figure 2.3.

Figure 2.3. Hypothetical data of calendar time transformed to analysis time scale.

Four possible distributions of visits are represented. The first panel shows visits displayed in calendar time. The second panel shows how data were recoded such that Day 1 reflected the first face-to-face visit for all clients. The arrows represent multiple visits with less than 180 days between them, with the number of visits written above the arrow. The number of visits for a participant is counted from Time 0 to the end of the arrow (prior to a break of more than 180 days). Visits are grouped as an Episode of Care (EoC) if there were at least minimum of three visits in 180 days, following a free-period (time with no visits) of at least 180 days since the previous EoC. Solid lines reflect visits analyzed in the current study; dashed lines reflect visits that were excluded from analyses.

SI (Start of Involvement) Only reflects an individual who had 2 visits, the second visits being about 50 days after the first, with no visits thereafter; as this was less than 3 visits, this individual did not have an episode of care (EoC).
EoC1 Only reflects an individual with four visits within about 90 days; as this was more than 3 visits in 180 days, this individual had a single EoC.
SI + EoC1 reflects a third individual with one visit, and then more than 180 days later, has another six visits. In the case of SI + EoC1, only those visits in SI (the solid arrow) are counted, not those in EoC1 (the dashed arrow).
EoC1 + EoC2 reflects a fourth individual with three visits within about 60 days, followed by 5 visits more than 180 days later. Only those three visits in EoC1 (solid arrow) are counted, not those in EoC1 (the dashed arrow).



Child and Adolescent Needs and Strengths (CANS)

The CANS (Lyons, 1999) is a measure of the needs and strengths a child/family possesses and how these should influence the design of individualized service plans. The CANS assesses six dimensions of client functioning, five of which assess need: (a) problem presentation (e.g., oppositional behaviour, depression/anxiety, situational and temporal consistency of symptoms), (b) risk behaviours (e.g., self-injurious behavior, aggressive behavior towards others, crime/delinquency), (c) child functioning (e.g., intellectual functioning, school attendance, sexual development), (d) care intensity and organization (e.g., permanence of service providers, level of adult monitoring needed for child), and (e) caregiver needs (e.g., caregiver physical/mental health, caregiver capacity for monitoring the child, caregiver social supports);

one dimension assesses strength, (f) child strengths (e.g., child's interpersonal skills, permanence of significant relationships in the child's life, child's optimism). Across all dimensions, a total of 50 items are scored on a 4-point scale (need domain: 0= no evidence, 1= watchful waiting/prevention, 2= action needed, 3= immediate/intensive action; strength domain: 0= strength is a center piece for child, 1= useful strength, 2= available strength, not necessarily developed, 3= no strengths). Higher scores always indicate worse functioning. Standard protocol for completing the CANS is to code "no evidence" (i.e., 0 for problems and strengths) when there was insufficient information to complete the rating.

Reliability of this measure has been demonstrated (inter-rater reliability = .85; Lyons, Rawal, Yeh, Leon, & Tracy, 2002). CANS dimension scores have been shown to correlate with other measures of child status, such as the Child and Adolescent Functional Assessment Scale (CAFAS), indicating adequate construct validity (Dilley, Weiner, Lyons, & Martinovich, 2007).

In this study, research assistants completed the CANS using information gathered in the chart review. A study specific coding manual was developed, which involved both descriptions and examples associated with each item, to aid in inter-rater reliability of chart review coding. The CANS has been used previously in a chart review format (Anderson, Lyons, Giles, Price, & Estle, 2003). In the current study, the CANS was scored in two different ways, for two distinct uses. (1) To assess predictors of dropout by various definitions, the CANS was scored at the dimension level (similar to scoring suggestions from the developer of the measure); each of six dimension scores were obtained by averaging the scores on all the items within that domain (Lyons, 1999). This scoring reflects the needs and strengths of the child and family at the data was added to the client's chart (Lyons, 2009); Appendix C lists the CANS items sorted into dimensions. (2) Alternatively, to sort need for treatment at intake, a second method was used to

score the CANS, a level-of-care algorithm. This CANS-based algorithm is used to support and improve treatment decision making. The levels of care suggested by the algorithm include: (a) traditional clinic options (e.g., outpatient, pharmacological treatment), (b) supportive case management, (c) intensive case management, (d) home and community services, and (e) residential treatment. The CANS-based decision algorithm has been used successfully within the American child welfare system. In Illinois, when used to determine treatment needs for wards of child welfare (i.e., Department of Child and Family Services), greater improvement in clinical symptoms were recorded when treatment decisions were made using CANS recommendations (Chor, McClelland, Weiner, Jordan, & Lyons, 2012). Similarly, treatment decisions consistent with the CANS algorithm are more stable than placements which are not consistent with the algorithm recommendation, as demonstrated in the child welfare system in Tennessee (Epstein, Schlueter, Gracey, Chandrasekhar, & Cull, 2015).

Variables Used in Preliminary Analyses

Brief Child and Family Phone Interview (BCFPI)

The Brief Child and Family Phone Interview (Boyle, 2009; Cunningham, Boyle, Sunjin, Pettingill, & Bohaychuk, 2009) obtains parental assessments of emotional and behavioral problems exhibited by 3- to 18-year-olds referred to child mental health services. It was administered by a clinical interviewer at the point of intake or shortly thereafter.

The psychometric properties of the BCFPI have been evaluated with a community sample of 1,712 children and a clinic referred sample of 1,512, as well as a province –wide sample (N=56,825) of 6- to 18-year olds, referred to community mental health service agencies in the Ontario Child Health Study (Cunningham et al., 2009). The BCFPI has good internal consistency and test-retest reliability; factor analyses provide support for the construct validity of the

measure (Cunningham et al., 2009).

Items are rated as 0, never true; 1, sometimes true; and 2, often true. Composite scales were calculated by combining multiple subscales, including; (a) Total Mental Health Problems (subscales; Externalizing Behaviour – made up of Regulating Attention, Impulsiveness and Activity Level, Cooperativeness, and Conduct, and Internalizing Behaviour – made up of Separation from Adults, Managing Anxiety, Managing Moods) (b) Impact on Child Functioning -the extent to the child's mental health problems adversely affected the child's social participation, quality of social relationships, and school participation and achievement - was assessed by eight questions (c) Global Family Situation – the burden of the child's mental health problems on the family, (i.e., potential breakdown in family networks, conflict between partners and overall distress related to the child) – was assessed by seven questions. (Cunningham, Pettingill, & Boyle, 2006). The BCFPI is scored using both age (i.e., ages 6-12 and 13-18) and sex based norms, and allows comparisons to general population or clinical data bases. The results of the BCFPI are summarized as t-scores (which correspond to percentiles), scores can be grouped as above or below the clinical cutoff (i.e., t-score of 70) for each scale.

In the current study, the BCPFI closest to the date of the child's first in-person visit was used; the measure had to have been completed within seven months before the first visit or three months after. This time frame was chosen as the BCPFI may be completed at first contact with an agency and the wait for CAMHS in Ontario is often six months. An overall indication of the child's emotional and behavioral problems was computed from BCFPI scores by counting the number of composite scales with a T-score in the clinical range; scores were then grouped as 0-1 or 2-3 (as suggested by Meyers, 2006).

Child and Adolescent Functional Assessment Scale (CAFAS)

The CAFAS (Hodges & Wong, 1997) is one of the most widely used measurements for assessing overall psychological adjustment in children and adolescents (Bates, 2001) and has been shown to predict service utilization and cost (Hodges & Wong, 1997). The CAFAS has demonstrated good interrater reliability (Hodges & Wong, 1996) and construct validity when compared to a number of global measures of psychopathology and problematic behaviors, including (Hodges & Wong, 1996); (a) the Child Assessment Scale (CAS; Hodges, 1990) and its parent form, the Parent Child Assessment Scale (PCAS; (Hodges, 1990), which assess psychopathology in general; (b) the Burden of Care Questionnaire (BCQ; Bickman, Heflinger, Pion, & Behar, 1992), assessing objective and subjective burden experienced by parents of children with serious emotional or behavioral problems; and (c) the Child Behavior Checklist (CBCL; (Achenbach, 1991) for the parent, the Youth Self-Report (YSR; Achenbach & Edelbrock, 1983) for youths aged 11 and older, and the Teacher Report Form (TRF; Edelbrock & Achenbach, 1984) - instruments designed to assess child psychopathology from multiple informants.

The CAFAS provides ratings across eight critical life subscales: Role Performance at School, at Home and in the Community, Behavior toward Others, Mood/Self-Harm, Substance Use and Thinking. Ratings on individual items are made on a four-point Likert scale, ranging in increments of 10; from “0 – Minimal or no impairment” to “30 – Severe Impairment”. A rater chooses the most appropriate descriptor of impairment for the child on each item. A total score is computed by totaling the eight subscales. A higher score indicates greater impairment with a range of 0 to 240. Within CAMHS agencies in Ontario, the CAFAS was completed by the treating clinician following three months of the start of service, and then is repeated every three months thereafter. In this study, data from the CAFAS closest to the final visit was used. CAFAS

scores were dichotomized to represent a "good" (i.e., Total score < 40) or "poor" (i.e., Total score >/= 40) outcome (as per recommendations by Hodges, Wong, & Latessa, 1998). Dichotomized scores were used as an indicator of positive treatment outcomes in determining the optimal number of sessions for the need-based definition.

2.5.3 Data Analyses

Analyses were conducted using SPSS (Version 24.0) for Windows. All analyses were conducting with weighting applied to ensure the subsample in the current study was representative of the principal study population. A full description of weighting procedures can be found in Appendix D. Briefly, an equal number of charts (n=25) were sampled from each of the five patterns of service use at each of the five agencies. However, in reality the number of cases within each pattern of service use varied (see Appendix E). Inferences in the present study aimed to be applicable to the entire population of children receiving CAMHS, as in the principal study. Thus, weighting was applied. For a comparison of weighted and unweighted sample characteristics see Appendix F.

Mental health service use and the coded disposition at discharge, along with CAFAS and BCFPI scores were used to develop a need-based definition of dropout. Mental health service use and the coded disposition at discharge were used to code individuals as a dropout or completer according to a dose and a clinician judgement definition, and the new need-based definition of dropout. Crosstabs were used to map the individuals who met various combinations of definitions of dropout (i.e., all three definition of dropout, any one or two definitions of dropout, or no definitions of dropout). Demographic and service use characteristics of individuals meeting various overlaps of definitions were described. Discriminant function analysis was used to predict membership in the groups of individuals who met: (a) all three definition of dropout, (b)

any one or two definitions of dropout, or (c) no definitions of dropout. Predictor variables included demographic (e.g., child age, child sex, parental marital status, total number of members in the household, CAS involvement) and CANS dimension scores. Discriminant function analysis allows an understanding of the classification of specific cases into groups and suggests an interpretation of the pattern of differences among the predictors as a whole, in order to best understand the dimensions (or discriminant functions) along which groups differ (Tabachnick & Fidell, 2000). Predictors were entered in a direct manner. A priori probabilities of assignment to groups in classification was influenced by sample size (Tabachnick & Fidell, 2000). Given unequal covariance matrices, separate covariance matrices were used for classification purposes (Tabachnick & Fidell, 2000).

2.5.4 Preliminary Analyses

Demographic Data

Missing demographic data occurred in less than 5% of cases for number of household members; missing data were substituted based on families with similar marital status and CAS involvement. For example, for individuals living at home with married parents, the mean number of household members was 4; for single parent families, 3, for individuals residing under the care of CAS or in a foster or group home, 4.

Numbers of sessions flagged as a univariate outlier (greater than 3.29 times the standard deviation above the mean; Tabachnick & Fidell, 2000), were truncated at the highest value not flagged as an outlier. In total, 10 cases were identified as outliers in terms of number of sessions.

Defining Need

Developing a need-based definition of dropout required defining (a) need (i.e., child problem severity, and the family/caregiver context of that problem at intake) and (b) the optimal

number of treatment sessions required based on need at intake. In other words, individuals were first sorted by need at intake. An individual was then considered a dropout if they attended fewer sessions than required, as indicated by their level of need at intake. To determine the optimal number of sessions required, as a function of need, only clients who were known to have completed treatment were examined.

Problem Severity at Intake. The CANS decision support algorithm was used to place children into low or high need groups. Low Need group included cases sorted into the Traditional Clinic Option or Supportive Case Management categories; the High Need included cases in the Intensive Case Management, Home and Community Services, or Residential categories.

Use of the CANS decision support algorithm was compared to defining need based on a simple summation of CANS item scores and a median split; see Appendix G. Results were similar with both methods. Therefore, use of the CANS algorithm was chosen as it has been used in other studies (Chor et al., 2012; Epstein et al., 2015), unlike a simple summation of CANS items scores.

Number Of Treatment Sessions Completed. Only individuals considered completers (n=178; i.e., those coded as "Treatment Completed" as Disposition at Discharge in the Principal Study) were used in the analyses. Only completers were used in order to assess the number of sessions which are generally required to ensure a positive outcome at discharge from treatment. There was high variability within both the low and high need groups in terms of the number of sessions attended (low need visits ranged from 1-114; high need ranged from 3-146). For this reason, further analyses were conducted to determine the optimal number of sessions required to be considered a "treatment completer" in each need group.

Receiver Operating Curve (ROC) analyses were performed, evaluating number of sessions attended vs. the CAFAS as an outcome to determine the optimal cut-point of number of sessions to predict the CAFAS outcome. ROCs plot the true positive rate against the false positive rate for the different possible cut-points of a diagnostic, or binary classification test. The optimal cut-point is the point at which both sensitivity and specificity are maximized. Area under the curve (AUC) scores are used to determine the overall accuracy of the binary classification test; scores higher than .80 represent good accuracy. ROC analyses were performed separately for the High and Low Need Groups, as conceptually it was expected the cut-off would need to differ for each of these groups. Comparing the number of sessions attended to an outcome measure, such as the CAFAS, allows for better understanding of the relationships between number of sessions and outcomes, beyond the clinician judgement that individuals had completed treatment. As noted above, CAFAS scores at "outcome" (i.e., visit closest in time to the last session) were dichotomized; scores less than 40 reflect positive outcomes; scores greater than 40 reflect a poor outcome (i.e., moderate to servere impairment; Hodges et al., 1998).

Low Need. The ROC curve in the Low Need group met criteria for a moderately useful test (Area Under Curve (AUC)=.792; Rice & Harris, 2005). A cut-off of approximately 8 sessions yielded .726 sensitivity and .640 specificity (See Figure 2.4). Above 8 sessions, a majority of individuals (81%) are achieving a "Good" CAFAS outcome, whereas below 8 sessions the likelihood is lower (50%; See Table 2.2). Thus, a cut off of 8 sessions was chosen as the criterion for minimal number of treatment sessions amongst children with Low Need.

Figure 2.4. Receiver Operating Curve (ROC) for those coded as Low Need at intake.

The solid line is created by plotting the true positive rate (sensitivity) against the false positive rate (1-specificity) at various thresholds, or possible cutoffs. The solid line shows the optimal cutoff in terms of number of sessions in order discriminate individuals by dichotomized CAFAS outcome. The dotted line represents with no discriminating ability (50:50 chance). The optimal cutoff in terms of balancing sensitivity and specificity is considered to the point where the solid line is closest to the top left corner of the diagram. The area under the solid line (known as the area under the curve; AUC) indicates the overall accuracy of the "test", number of sessions, at discriminating individuals based on CAFAS outcome.

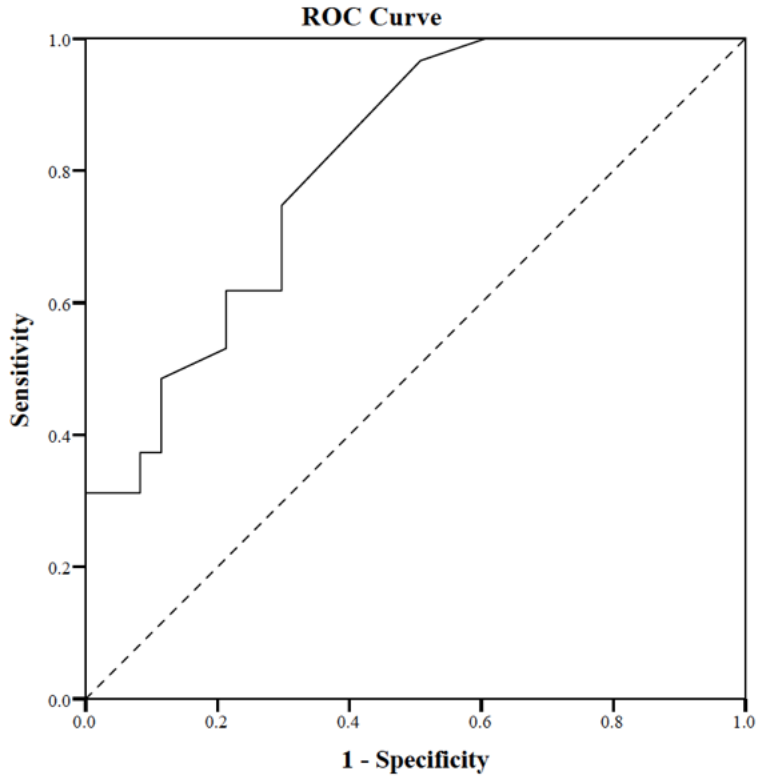


Table 2.2.

Low Need - Number of Sessions By Discharge CAFAS Outcome

Number of Visits	Discharge CAFAS Outcome	
	Poor[a] (CAFAS >40) – Row % (n)	Good (CAFAS <40) – Row % (n)
< 8 Visits	53.3% (8)	46.7% (7)
>/= 8 Visits	17.4% (4)	82.6% (19)

Note: N=35, CAFAS=Child and Adolescent Functioning Assessment Scale.
[a]Data have normalized weighting applied

High Need. The ROC curve in the High Need group had very low diagnostic accuracy (AUC = .400; See Appendix H), indicating that number of sessions alone does not predict CAFAS outcome within the High Need group. Two other demographic variables – single parent status and child welfare involvement - were assessed to determine if further risk stratification was appropriate within the High Need group. Single parent marital status has been associated with use and dropout from children's mental health services (Armbruster & Kazdin, 1994; Kazdin, Holland, & Crowley, 1997; Warnick et al., 2012); single parents are thought to be more overwhelmed by the parenting responsibilities, and are likely to have lower socioeconomic status and mental health problems of their own, which are also associated with child abuse, child victimization and child mental health challenges (Lipman, Offord, & Boyle, 1997; Turner, Finkelhor, & Ormrod, 2006; Wolfe, 1999). Unfortunately, marital status was not known for all participants. Thus "Single Parent" status was compared to all other relationships states (i.e., Married, Common Law, Other, Unknown).

Given the small sample sizes of the High Need Group (High Need & Single, n=5, High Need & Married, n=14), ROC analyses were inappropriate (Hanley & McNeil, 1982; Obuchowski, 1994).

Cut-offs were chosen as number of sessions at which the frequency of the individuals having a "Good" CAFAS score at outcome was raised substantially. Sessions were grouped as 8, 16, or 24 sessions. The cutoff used for the low need group (8 sessions) is the same as suggested by Angold and colleagues as a cut-off for a minimum number of sessions needed for significant improvement in CAMHS (Angold, Costello, Burns, Erkanli, & Farmer, 2000). Additionally, the cut-off of 24 sessions for high need single parents is also similar to that shown by Angold and colleagues to be related to even greater improvements in CAMHS (Angold et al., 2000). Of note, Angold and colleagues did not provide any rationale for their choice of these cut offs (Angold et al., 2000). However, seminal dose-effect work in psychotherapy with adults suggested that 50% of patients would improve by 8 sessions, while 75% would improve by around 26 sessions (Howard, Kopta, Krause, & Orlinsky, 1986). Furthermore, these cut-off values are common in the dropout literature. For example, 8 and 16 sessions have been used as cutoffs for number of visits in dropout studies, with these numbers of sessions being relevant to the specific manualized treatments being used (Lock et al., 2006; Pereira, Lock, & Oggins, 2006; Robbins et al., 2006); and 16 sessions was found as mean number of visits across youth in standard and modular treatments for Depression, Anxiety and Conduct problems (Weisz et al., 2012).

The overall Pearson Chi Square for High Need children who completed treatment grouped by CAFAS (poor vs. good) and sessions (< 24, >/=24 sessions) was significant (X^2=3.971, p=.046) indicating there was a difference in the likelihood of having a good outcome CAFAS based on the number of sessions attended.

Within High Need children, those with a single parent had a positive outcome CAFAS score less often if they also attended a low number of sessions (fewer than 24 sessions, 0%), than those attending a higher number of sessions (24 sessions or more, 50%). Of note, no children received fewer than 16 sessions.

Within the High Need group, a different cut-off was chosen for individuals whose parents were married. Children with married parents, had a positive outcome CAFAS score less often if they also attended a low number of sessions (fewer than 16 sessions, 75%), than those attending a higher number of sessions (16 or more, 100%) (See Table 2.3).

It is possible that systematic differences between children with versus without a CAFAS may have influences the analyses above. Thus, the distribution of individuals above and below the respective cutoffs in terms of the number of sessions was examined. The total number of sessions was similar for those with and without a CAFAS. This suggests the use of the sample with a CAFAS to determine cutoffs for number of sessions may not have been biased. This analysis is laid out in Appendix I, along with sample characteristics of completers with and without a CAFAS.

Table 2.3.

High Need - Marital Status by Number of Sessions by Discharge CAFAS Outcome

Marital Status	Number of Visits	Discharge CAFAS Outcome	
		Poor[a] (CAFAS >40) – Row % (n)	Good (CAFAS <40) – Row % (n)
Single Parent	16–23 Visits	100% (1)	0% (0)
	> 24 Visits	50% (2)	50% (2)
	<16 Visits	25% (1)	75% (3)
Married/Common Law/Other/Unknown	16–23 Visits	0% (0)	100% (4)
	> 24 Visits	16.7% (1)	83.3% (5)

Note: N=19, CAFAS=Child and Adolescent Functioning Assessment Scale.
[a]Data have normalized weighting applied

Psychometrics of the CANS Dimensions

The psychometrics of the CANS and its dimensions was assessed in this sample, in preparation for the discriminant function analysis. The entire CANS measure consists of 50 items and Cronbach's alpha was .79 which indicates acceptable internal consistency. Cronbach's alpha for different dimensions was: (a) 13-item Problem presentation (α = .67), 6-item Risk Behavior (α =.55), 7-item Functioning (α =.41), 4-item Care Intensity and Organization (α =.33), 7-item Caregiver Needs and Strengths (α =.56) and 10-item Strengths (α =.57). Although these Cronbach's alpha indicate a range from unacceptable to questionable, researchers have advocated that unlike classic psychometric measures, clinimetric measures like the CANS are constructed such that each item should assess a unique aspect of the phenomena; suggesting internal consistency is not as important in clinimetric measures compared to other types of measures (Turner et al., 2010).

Convergent validity between average dimension scores from the CANS and related composite scales from the BCFPI were also examined. CANS Problem Presentation and BCFPI Total Mental Health Problems were significantly correlated, r=.570, p=.000, as were CANS Functioning and BCFPI Global Child Functioning, r=.427, p=.000. As well, although the BCFPI does not have a direct measure of strengths, the CANS Strengths dimension is not significantly related to the BCFPI Total Mental Health Problems composite scale, r=.039, p=.465. The full correlation matrix between CANS dimensions and BCFPI composite scales is presented in Appendix J.

2.6 Results

2.6.1 Sample Characteristics

A summary of the demographic characteristics of the sample at intake are presented. Given small cell sizes, some categories of CAS involvement were combined. Variables are sorted according to Andersen's Socio-Behavioral model (Aday & Andersen, 1974) of health service use (i.e., predisposing, enabling and need factors) (see Table 2.4). A summary of the three operational definitions, and the resulting prevalence rates of dropout, used in this study are presented in Table 2.5, followed by a detailed review of each definition.

Table 2.4.

Summary of Sample Demographics

Demographic Characteristics	Sample[a] % (n) or M (SD)
Predisposing Child Characteristics	
Sex (male)	62.2% (389)
Age	9.4 (2.5)
Enabling Characteristics	
Parent Marital Status	
Married/Common Law/Living Together	60.9% (381)
Single Parent	36.8% (230)
Unknown/Other	2.3% (14)
Number of Household Members	4.1 (1.2)
Need Characteristics	
Children's Aid Society (CAS) Involvement	
No Involvement	64.2% (402)
Investigation	9.7% (61)
Some Involvement	10.9% (68)
Supervision/Temporary Care/Crown Ward	15.1% (95)

Note: N=625, CAS = Children's Aid Society

[a]Data have normalized weighting applied.

2.6.2 Operational Definitions of Dropout

Table 2.5.

Description and Prevalence of Dropout According to Each Operational Definition

Dropout Definition	Description of Dropout	Prevalence of Dropout
Dose	Attending less than 12 sessions within a 16-week time frame	93.5%
Clinician Judgement	A coding at discharge indicated the child/family has dropped out, or refused additional treatment	53.3%
Need-Based	Low Need: Attending fewer than 8 sessions High Need & Married Parents: Attending fewer than 16 sessions High Need & Single Parent: Attending fewer than 24 sessions	63.0%

Note: N=521.

Dose Definition

The criterion used by Warnick et al. (2012) – completing fewer than 12 sessions within 16-weeks – was applied as the dose definition. Children who attended fewer than 12 sessions overall, or took longer than 16 weeks to complete 12 sessions were coded as a dropout; 93.5% of children were classified as having dropped out.

Clinician Judgment Definition

Consistent with previous studies (e.g. Garcia & Weisz, 2002; Kazdin et al., 1994; Kazdin & Wassell, 1998; Lai et al., 1998) clinician judgement alone was used as the second definition of dropout. The present study did not have explicit ratings by clinicians at time that families stopped treatment. However, the disposition at discharge coding is based on clinician notes and thus captures clinician's views. The following disposition codes were combined as reflecting

dropout “Dropped Out” (n=196), “Treatment Received, Refused Additional Treatment” (n=43), and “Refused Treatment” (n=43). All of these codes indicate the clinician felt treatment was needed and the family either did not agree and/or did not attend as recommended. All of those individuals coded as “Completed Treatment” (n=282) were counted as completers. The following categorizes were excluded from the analyses: “Treatment Ongoing” (n=18), “Assessment Only” (n=32), “No Treatment Received” (n=15), “Moved” (n=17), and “Unknown/Other” (n=11). Using this definition, 53.3% of children were classified as having dropped out.

Need Definition

The need-based definition of dropout utilized; (a) problem severity at intake and (b) number of treatment sessions completed, to determine dropout stats. Table 2.6 summarizes the service use (i.e., number of sessions attended, duration of treatment, type of services) for individuals spilt into the low and high need groups. Table 2.7 outlines the sample characteristics of individuals who fell above or below the chosen cut-offs (i.e. low need, 8 sessions; high need married parents, 16 sessions; high need single parent 24 sessions) for their respective need strata. Individuals are sorted to represent those coded as a dropout or completer by the need-based definition; sample characteristics for dropouts and completers overall according to the need-based definition are also presented. Notably, individuals classified as high need were more often male and high need individuals with single parents had higher levels of involvement with CAS. As well, completers regardless of need strata, have more involvement with the CAS.

In terms of service use, dropouts overall attended fewer sessions on average (4.3) than completers (28.3). Correspondingly, the average duration of treatment was also shorter for dropouts (94.5) than completers (352.7) on average. Individuals classified as dropouts attended

sessions predominately classified as low intensity. Whereas, individuals classified as completers attended sessions predominately classified as medium intensity. As well, high need with single parents attended the highest number of sessions on average, followed by high need with married parents and low need individuals, across both dropouts and completers. Finally, a greater percentage of low need individuals attended predominately low intensity sessions, while a greater percentage of high need individuals attended predominately medium intensity sessions.

Table 2.6.

Service Use by Need Group

	Low Need[a] N=306	High Need N=222
	% (n) or M (SD)	% (n) or M (SD)
Number of Sessions	9.30 (12.5)	18.53 (26.8)
Duration of Services	163.7 (229.8)	226.7 (271.4)
Type of services		
Low intensity	52.8% (162)	31.8% (70)
Medium intensity	37.1% (114)	40.9% (108)
High intensity	10.1% (31)	19.3% (43)

Note: N=528

[a]Data has normalized weighting applied

Table 2.7.

Comparison of Sample Characteristics Around Chosen Cutoffs for the Need Definition

	Dropouts[a]				Completers			
Demographic Characteristics	Low Need <8 Visits N=172 %	High Need Married Parents <16 Visits N=90	High Need Single Parents <24 Visits N=70	Dropouts Overall	Low Need >8 Visits N=134	High Need Married Parents >16 Visits N=44 % (n)	High Need Single Parents >24 Visits N=18 % (n)	Completers Overall
	% or M	% or M	% or M	% or M	% or M	% or M	% or M	% or M
Predisposing Child Characteristics								
Sex (% male)	55.0%	68.8%	68.3%	61.5%	55.9%	68.8%	79.0%	60.9%
Age	9.5	9.6	9.8	9.6	9.1	9.0	8.9	9.1
Enabling Characteristics								
Number of Household Members	4.2	4.6	3.2	4.1	4.2	4.5	3.1	4.2
Need Characteristics								
CAS Involvement								
No Involvement	76.3%	63.7%	59.1%	69.3%	64.4%	54.0%	31.1%	59.1%
Investigation	10.6%	8.9%	14.1%	10.9%	9.3%	10.9%	7.0%	9.4%
Some Involvement	2.1%	10.5%	11.3%	6.3%	15.2%	8.6%	37.5%	15.7%
Supervision/Temporary Care/Crown Ward	11.1%	16.9%	15.5 %	13.6%	11.1%	26.6%	24.5 %	15.8%
Services Received								
Number of Sessions	2.6	5.0	7.0	4.3	17.8	45.9	64.9	28.3
Duration of Treatment	75.0	89.3	149.2	94.5	277.0	495.7	577.6	352.7
Type of services								
Low intensity	63.9%	42.6%	31.6%	51.3%	38.7%	18.2%	10.4%	31.6%
Medium intensity	27.7%	40.4%	48.5%	35.6%	49.1%	59.3%	68.0%	53.0%
High intensity	8.4%	16.9%	19.9%	13.1%	12.2%	22.5%	21.6%	15.3%

Note: CAS = Children's Aid Society.

[a]Data has normalized weighting applied

[b]Cell count is rounded to the nearest whole number

Comparison of Definitions and Overlap

Table 2.5 summarizes the three operational definitions of dropout used and the prevalence of dropout associated with each definition. The dose definition resulted in the highest proportion of the sample categorized as a dropout (93.5%), followed by the need-based definition at 63.0% and the clinician judgement definition at 53.3%. The overlap of individuals meeting multiple definitions were computed (See Table 2.8). About a third of individuals met all three definitions of dropout (38.4%), 36.3% met any two definitions, 22.2% met any single definition and 3.2% met no definitions of dropout (i.e., treatment completers). When only one definition was met, it was most often the dose definition, and there were no individuals who only met the need-based definition. Looking at meeting any two definitions, the most common combination was the dose definition and need definition, followed by the dose and clinician judgement, and less than 1% of individuals meeting only the clinician judgement and need-based definitions.

Demographic and service use characteristics are detailed for individuals meeting no definitions of dropout, any one or two definitions of dropout, and all three definitions, as well as the overall sample for comparison (see Table 2.9). Individuals meeting no definitions are more likely to be male, less likely to have married parents, and had higher levels of CAS involvement. Although it should be noted that the sample size of individuals meeting no definition of dropout is small (n=17). Individuals meeting any one or two definitions of dropout were more likely to have married parents and no involvement with CAS. In terms of service use, those meeting no definitions of dropout attended the highest number of sessions on average over the highest number of days (number of sessions M=49.4; treatment duration in days M=353.4), followed by those meeting any one or two definitions of dropout (number of sessions M=16.8; treatment

duration M=231.5), and those meeting all definitions of dropout (number of sessions M=4.6; treatment duration M=113.6).

Figure 2.5 visually displays service use intensity across individuals meeting various overlap groups of definitions; showing that majority of individuals meeting no definitions of dropout use predominately low intensity services, whereas majority of individuals meeting any one or two definitions or all definitions of dropout use predominately medium intensity services.

Table 2.8.

Overlap of Definitions of Dropout

Number of Definitions Met	Dose[a]	Clinician Judgement	Need-Based	*n*	%
No definitions	✗[b]	✗	✗	17	3.2
One definition					
	✓[c]	✗	✗	102	19.3
	✗	✓	✗	15	2.9
	✗	✗	✓	0	0
Total meeting any one definition				117	22.2
Two definitions					
	✓	✓	✗	62	11.7
	✓	✗	✓	127	24.1
	✗	✓	✓	2	0.4
Total meeting any two definitions				191	36.2
All three definitions	✓	✓	✓	202	38.4
n	493	282	332		
%	93.5	53.3	63.0		

Note: N=521.
[a]Normalized weighting applied.
[b]✓ = Definition individuals met
[c]✗ = Definition individuals did not meet

Table 2.9.

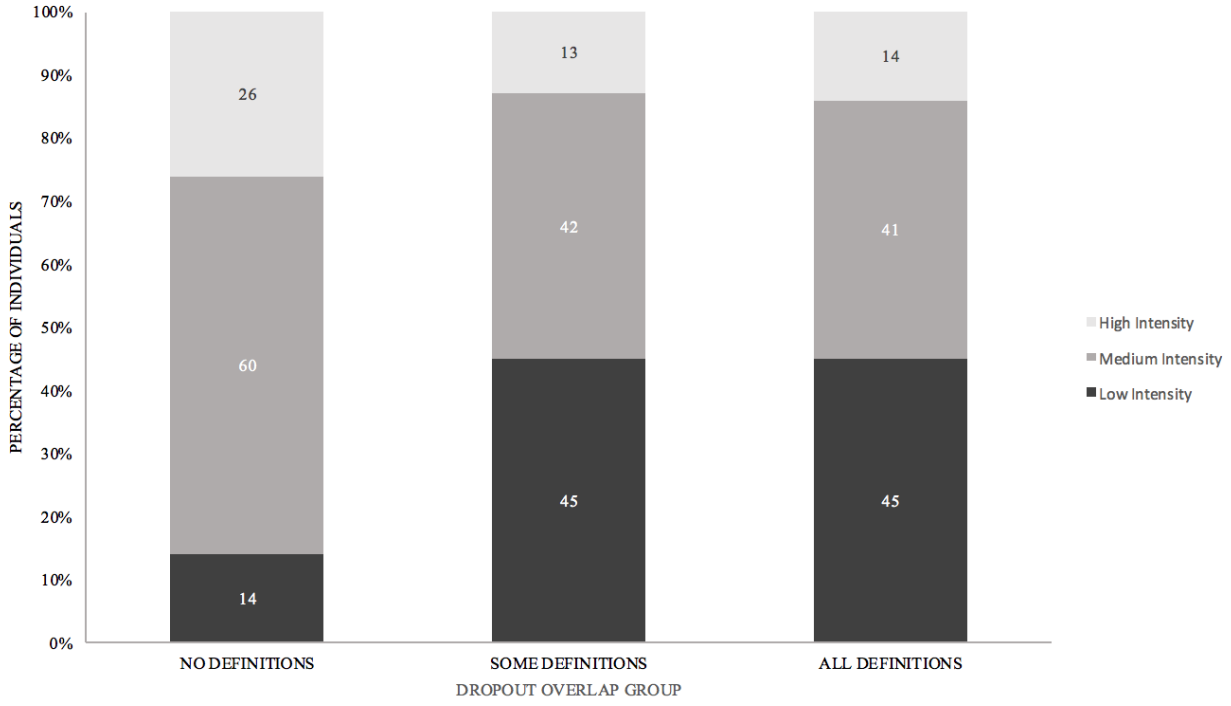
Comparison of Sample Characteristics Meeting Various Overlaps of Definitions

Demographic Characteristic	No Definitions[a] N=17 % (n)	Any 1 or 2 Definitions N=308 % (n)	All 3 Definitions N=202 % (n)	Overall Sample N=528 % (n)
Predisposing Child Characteristic				
Sex (male)	84.7 (14)	60.1 (185)	61.1 (124)	61.3 (323)
Age M (SD in years)	9.4 (2.3)	9.2 (2.4)	9.7 (2.5)	9.4 (2.5)
Enabling Characteristic				
Parent Marital Status				
Married/Common Law/Living Together	46.9 (8)	64.9 (200)	55.9 (113)	60.9 (321)
Single Parent	45.7 (8)	31.9 (98)	43.3 (88)	36.7 (194)
Unknown/Other	7.4 (1)	3.2 (10)	0.8 (2)	2.4 (13)
Number of Household Members M (SD)	4.0 (0.9)	4.2 (1.2)	4.0 (1.3)	4.1 (1.2)
Need Characteristic				
CAS Involvement				
No Involvement	52.5 (9)	69.5 (214)	60.5 (123)	65.5 (346)
Investigation	5.5 (1)	7.2 (22)	15.5 (31)	10.3 (55)
Some Involvement	14.3 (2)	11.1 (34)	7.4 (15)	9.8 (52)
Supervision/Temporary Care	25.0 (4)	10.3 (32)	16.4 (33)	13.1 (69)
Crown Ward	2.7 (0)[b]	2.0 (6)	0.2 (0)	1.3 (7)
Services Received				
Number of Sessions M (SD)	49.4 (35.0)	16.8 (22.4)	4.6 (3.9)	13.2 (20.3)
Duration of Treatment	353.4 (255.2)	231.5 (267.3)	113.6 (195.6)	190.2 (249.8)
Type of services				
Low intensity	13.8 (2)	44.8 (138)	45.2 (92)	44.0 (232)
Medium intensity	60.4 (10)	41.6 (128)	41.2 (83)	42.1 (222)
High intensity	25.7 (4)	13.5 (42)	13.6 (28)	14.0 (74)

Note: CAFAS=Child and Adolescent Functional Assessment Scale, CAS = Children's Aid Society
[a]Normalized weighting applied
[b]Cell count is rounded to the nearest whole number

Figure 2.5. The percentage of individuals with predominately each type of service use intensity (i.e., low, medium, high) by each dropout/completion status of each definition. Numbers shown in bars on the chart represent the percentage of individuals groups as predominately receiving each intensity of service.

Appendix A and B provide a detailed description of various combinations of types of services were used to categorize children into either low, medium, or high intensity of service use.



2.6.3 Discriminant Functions and Classification of Dropout and Completion

A discriminant function analysis was performed to predict the number of definitions of dropout an individual would meet (i.e., no definitions of dropout, any one or two definitions of dropout, all definitions of dropout).

Prior to performing the discriminant analysis, assumptions were checked. Cases that were univariate outliers on any predictor variables were removed (N=5), based on standardized scores in excess of 3.29 (Tabachnick & Fidell, 2000). One case with multivariate outliers was removed

based on an evaluation of Mahalanobis distance using the chi square distribution (Tabachnick & Fidell, 2000). Box's M test indicated that the covariance matrices are not equal (F=1.449 p=.002). However, this test is recognized as overly sensitive, especially with large sample sizes (Tabachnick & Fidell, 2000). For this reason, classification was compared using both separate and pooled covariance matrices, and found to virtually identical. Thus, classification results based on pooled covariance matrices are reported here. Ten independent variables (i.e. age, sex, involvement with CAS, number of household members, and six dimensions of the CANS) generated two canonical linear discriminant functions which discriminated between the three outcome groups (i.e., no definitions of dropout, any one or two definitions of dropout, all definitions of dropout).

The first function, based on two significant variables (i.e., CANS Caregiver Needs and Strengths, CANS Child Strengths) accounted for 82.8% of the total discriminating variance of all the variables in the model; the second function, based on three significant variables (i.e., CANS Care Intensity and Organization, CANS Risk Behaviors, and CANS Problem Presentation) accounted for the remaining discriminating variance. Chi square tests of Wilk's Lambda test the significance of the discriminating functions. The significant chi square associated with both the first and second function (X^2 (20, 515) =94.90, p=.000) and with only the second function (X^2 (9, 515) =17.13, p=.047), suggest both functions have significant discriminating ability.

The structure matrices for the discriminant function analysis are displayed in table 2.10. Means for each group on the significant predictor variables are shown in Figure 2.6. Figure 2.7 plots the loadings of all (significant and non-significant) predictor variables based on their association with each function. Figure 2.8 plots the overlap groups based on their means on each of the two discriminating functions.

By plotting the groups based on the means of the discriminant function it becomes clear that the first function is most distinctly discriminating between those who meet no definitions of dropout and those who meet either some or all definitions of dropout (see Figure 2.8). Those who met no definition of dropouts – otherwise known as true completers - were characterized by low levels of function 1, meaning fewer caregiver needs, and more available child strengths, and high levels of function 2, indicating high needs related to the child's care, high numbers of child risk behavior and high levels of child symptomatology. Whereas those that meet all definitions are characterized by higher means on function 1, meaning more caregiver needs, but fewer available child strengths, and lower means on function 2, indicating fewer needs related to the child's care, fewer risk behavior and lower levels of child symptomatology. Those who meet only one or two definitions of dropout fall somewhere in the middle on function 1 and are represented by low means on function 2. These two functions correctly classified 66.9% of the original grouped cases. The positive and negative predictive values for each group are displayed in Table 2.11. It should be noted that this classification is based on the development sample; bootstrapping procedures were not used.

Table 2.10.

Discriminant Function Analysis Structure Matrix

Predictor Variable	Function	
	1	2
CANS Caregiver Needs	.763	.332
CANS Child Strengths	.415	.080
Child Age	.207	.178
Number of Household Members	-.056	-.036
CANS Care Intensity and Organization	.001	.824
CANS Risk Behaviors	-.089	.715
CANS Problem Presentation	-.300	.683
CANS Functioning	-.084	.483
CAS Involvement	.043	.461
Child Sex	-.076	.444

Note: CANS=Child and Adolescent Needs and Strengths, CAS=Children's Aid Services.

Figure 2.6. Average Scores on CANS Dimensions by Individuals Meeting Each Group of overlapping Definitions. Only those CANS dimensions which were found to have significantly different means by group are displayed. Higher average CANS dimensions scores indicate worse functioning of the child or caregiver.

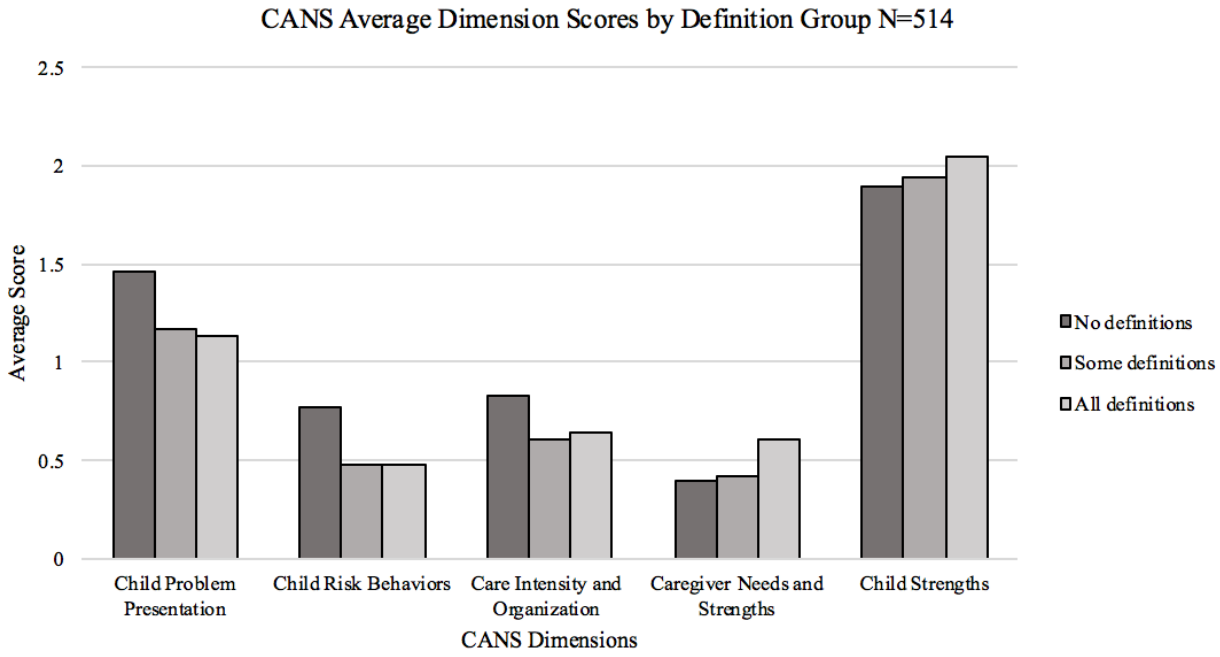


Figure 2.7. Predictor variables are plotted based on their loadings with each of the two discriminant functions that best distinguish the definition overlap groups (i.e., individuals who met no definitions of dropout, any 1 or 2 definitions of dropout or all three definitions of dropout) from one another.

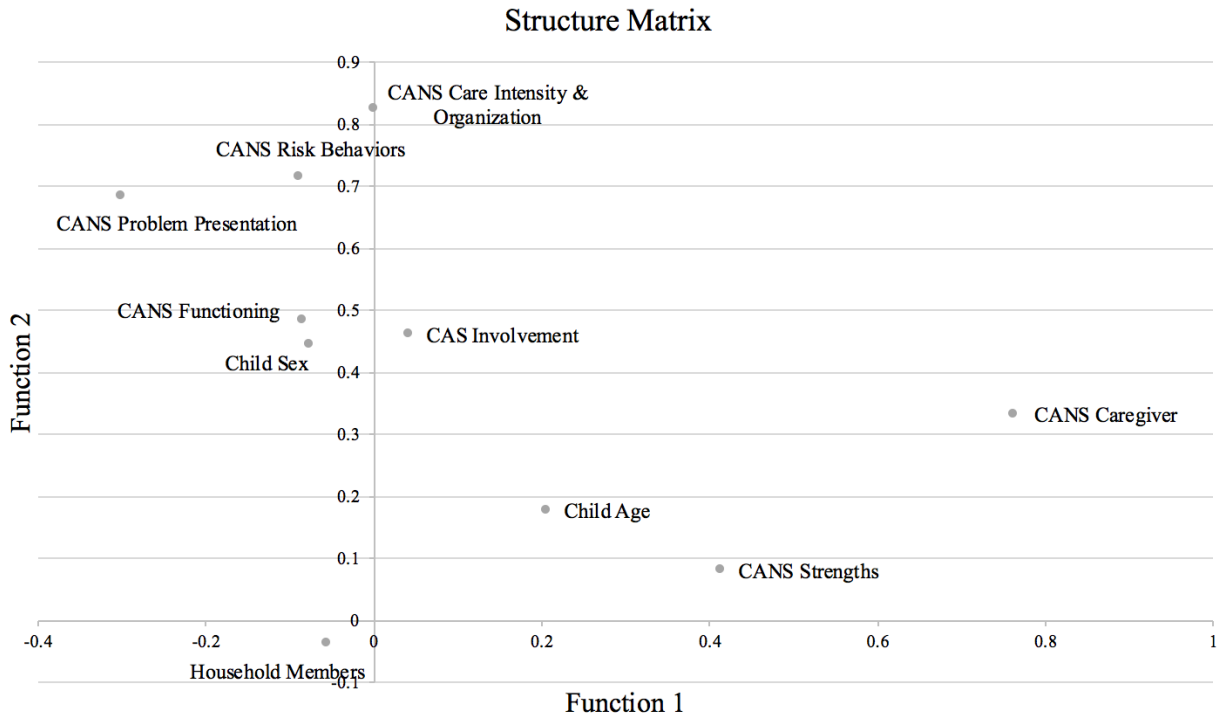


Figure 2.8. Definition overlap groups (i.e., individuals who met no definitions of dropout, any 1 or 2 definitions of dropout or all three definitions of dropout) are plotted based on their means on each of the two discriminant functions that best distinguish the groups from one another.

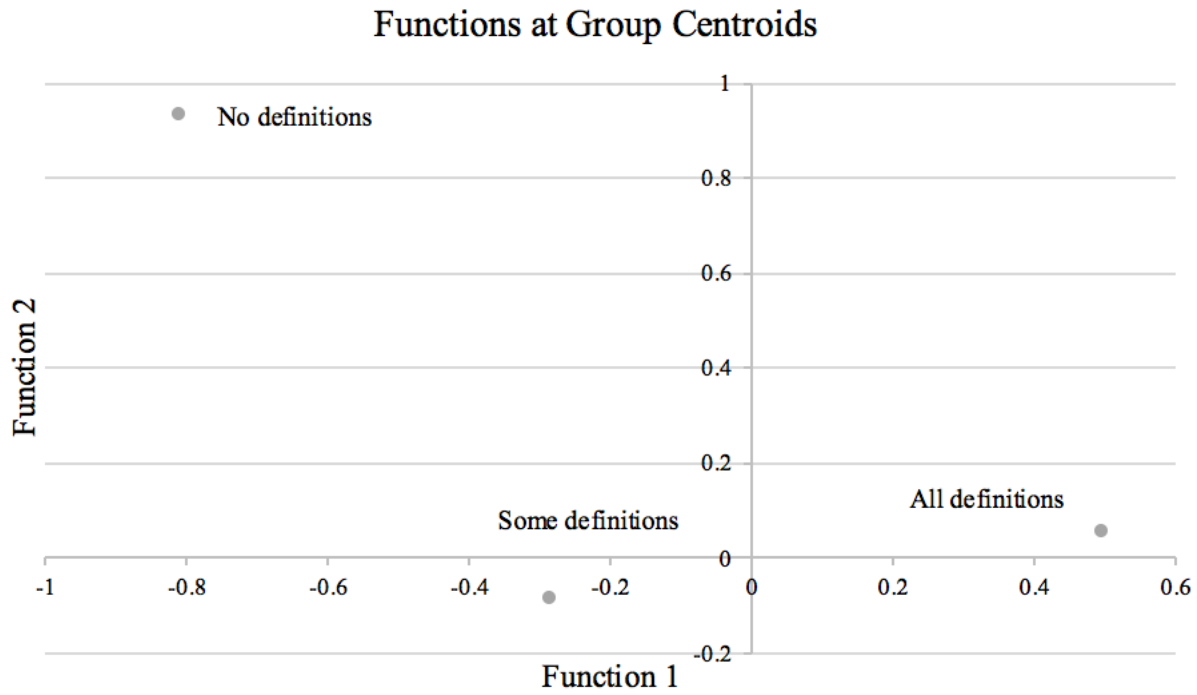


Table 2.11.

Positive and Negative Predictive Value of Classification of Definition Overlap Groups

Group	Positive Predictive Value	Negative Predictive Value
No definitions of dropout	50.0%	2.8%
Some definitions of dropout	66.9%	32.0%
All definitions of dropout	66.9%	29.5%

2.7 Discussion

This discussion will review the results and advantages of the need-based definition, the findings related to each of the overlap groups of dropout, followed by a review of the limitations and ideas for future directions in this line of research.

2.7.1 The Need-Based Definition

The current study proposed a need-based definition, which suggests the optimal number of sessions required should vary based on a client's level of need at intake. Dropout is then defined as receiving significantly lower than the optimal number of sessions. Using this need-based definition resulted in a dropout prevalence of 63% which falls between the dose (94%) and clinician judgement (53%) definitions. The average number of sessions amongst dropouts classified by the need definition is 4, majority of these sessions were low intensity (51%) and services occurred over a span of 94 days on average. In contrast, completers attended an average of 28 sessions, majority of which were medium intensity and occurred over 353 days. In terms of demographic variables, dropouts by the need-based definition had less involvement with CAS than completers. It is possible that involvement with child welfare services makes the attendance of mental health services mandatory or increases the motivation for parents to ensure children attend services.

The need-based definition used three need strata. The three need strata mapped on to intensity of services received, the number of sessions attended and duration of treatment, bolstering this method of sorting need. Those classified as higher need, regardless of parental marital status, attended sessions predominately classified as medium intensity. Whereas, individuals classified as low need attended sessions predominately classified as low intensity.

Individuals classified as high need were more often male. Male children are more likely than females to use mental health services (Burns et al., 1995; Padgett, Patrick, Burns, Schlesinger, & Cohen, 1993) and tend to use more services when in treatment (Realmuto, Bernstein, Maglothin, & Pandev, 1992). This may be due to male children being more likely diagnosed with externalizing disorders (Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993; Zahn-Waxler, 1993). Children with externalizing problems are more likely to enter mental health treatment (Wu et al., 1999) and receive more services (Hodges & Wong, 1997) than children with internalizing problems. Conversely, having fewer externalizing symptoms was associated with experiencing gaps in care (Brannan, Heflinger, & Foster, 2003). Caregivers are likely more aware of and burdened by externalizing than internalizing symptoms. The symptoms of these disorders (e.g., angry or irritable mood, defiant behavior, non-compliance with societal rules) may lead to more child risk behaviors (e.g., crime/delinquency, violence towards others), fewer child strengths (e.g., school attendance and achievement) and may put a higher strain on the required care organization (e.g., more significant monitoring required for the child) and caregivers (e.g., level of supervision the child requires). Caregivers would thus be highly motivated to seek and remain in treatment in order to have help in managing the mental health situation with their child. Greater global caregiver strain has been associated with the use of any service (Farmer, Burns, Angold, & Costello, 1997), psychiatric hospitals (Bickman & Foster, 1996), intermediate outpatient and residential services (Foster, Saunders, & Summerfelt, 1996; Warren Lambert, Brannan, Breda, Heflinger, & Bickman, 1998), and more restrictive levels of care (Hodges & Wong, 1997).

Moreover, high need individuals with single parents had higher levels of involvement with CAS. Single parents may lack resources (e.g., financial, social support) and may face higher

caregiver burden/strain. Ultimately, this may contribute to a higher likelihood of involvement with CAS.

Looking at dropouts versus completers by need strata, a similar pattern emerges across the strata. Completers, in low need and high need with married or single parents, have more involvement with the CAS. Children involved with the CAS likely have complex problems that caregivers do not feel they can manage on their own, or CAS may require services be obtained for the child. Completers also receive more services, over a longer period of time, and of a higher intensity. It is possible that completers either began receiving higher intensity services from the beginning or moved more quickly to higher intensity services. If these higher intensity services were more suitable or effective for the family, they may have been more inclined to remain in treatment than individuals who received majority lower intensity services.

2.7.2 Advantages of a Need-Based Definition

The need definition captures a middle ground between the dose and clinician judgement definitions. Conceptually, using a need-based definition circumvents some of the issues inherent to both the dose and clinician judgement definitions of dropout. A need-based definition is nuanced than a single dose for every individual which is unlikely to be suitable. Furthermore, this definition does not require opinions be gathered from clinicians, and can be applied to data post-hoc. The need-based definition also avoids the subjectivity of different ways clinicians may define dropout.

Some researchers suggest we need very work heavy and time consuming methods to define dropout. de Haan and colleagues suggest ideally we would measure both the opinion of the therapist, as well as that of the parent and potentially the patient, depending on their age, to define dropout in future studies. Furthermore, de Haan and colleagues (2013) write that if this is

done in combination with an objective instrument to measure changes in psychiatric problems, or success in achieving therapy goals, the most accurate assessment of dropouts will be created.

However, instead, the need-based definition suggests a method to define dropout that doesn't require this intensive work. The need-based definition does not require subjective opinions be gathered, and it provides instead an objective method for assessing dropout, which can be applied even after the family has left services.

As well, the need-based definition does begin to use an objective measure in an effort to corroborate definitions of dropout with objective evidence of need at intake and functioning outcomes. However, once reliable cutoffs are achieved, there would not be the need for so much work to assess outcomes for all individuals to correctly determine dropouts.

2.7.3 No Definitions of Dropout

A very small percentage of the sample met no definitions of dropout (3%) – in other words, only 3% of the sample could be identified as completing care. This is similar to the percentage of individuals found to meet no definitions of dropout (4%) in the comparable review by Warnick and colleagues (2012). It would appear that either our system is currently very unsuccessful at retaining youth with mental health problems in services, or the ways in which dropout is being defined are inconsistent, and possibly inadequate. Individuals who met no definitions of dropout attended many more sessions on average (49) than individuals who met only one or two definitions (M=17) or all definitions of dropout (M=5). These sessions took place over an average of 253 days. Majority of individuals (60%) meeting no definitions of dropout received predominantly medium intensity services.

The individuals who met no definitions of dropout were majority male, and slightly less likely to have married parents and had higher involvement with CAS. As discussed above, such

families likely find themselves in a very difficult situation. Up to 50% of children seen in child welfare settings have a psychiatric disorder and these children's problems and life situations are likely to be complex, pointing to a high need for mental health services (Burns et al., 1995). Thus, parents/caregivers are unlikely to be able to manage without the help of specialized services, and would likely have a high motivation to rectify the problems. Parental motivation for treatment has been shown to have an impact on treatment attendance (Nock & Kazdin, 2005).

Bolstering this, according to the discriminant function analysis, families meeting no definitions of dropout seem to be children who are in strong need of mental health services (i.e., high child problem severity and risk behaviors as measured by the CANS). Children with psychological disorders (Bums et al., 1995; Offord et al., 1987; Zahner, Pawelkiewicz, DeFrancesco, & Adnopoz, 1992) and functional impairments (Bird et al., 1996) are more likely to use mental health services. However, importantly, this high need is paired with capable caregivers (i.e., low caregiver needs as measured by the CANS) and a child able to take advantage of services (i.e., high child strengths as measured by the CANS). Essentially, this suggests a family with both the motivation and capability to continue in treatment. Children do not make decisions about seeking or remaining in mental health services alone, it is caregivers who do this.

Greater severity of child symptoms has been inconsistently related to dropout (e.g., Gonzalez et al., 2011; Kazdin & Wassell, 2000; Miller et al., 2008). In part this may be due to differences between the influences of varying types of symptoms on dropout. In a recent meta-analysis, more child externalizing problems consistently predicted dropout across both dose and clinician judgment definitions and both efficacy and effectiveness studies. However, in the same review more internalizing problems only predicted dropout in effectiveness studies, using a

clinician judgment definition. Moreover, one study found having fewer externalizing symptoms was associated with experiencing gaps in care (Brannan et al., 2003). In our sample, greater severity of child symptoms was indicative of families who met ***no*** definitions of dropout. It should be noted that the sample of individuals who met no definitions of dropout was very small, in part due to the high prevalence of dropout using the dose definition. This inconsistency may be rooted in the fact that child problem severity may influence dropout in more than one way. It is possible that child problem severity can serve as a motivator for families to remain in treatment as the family is less able to manage successfully on their own. Alternatively, child problem severity could be a barrier which makes it more difficult for the family to manage treatment attendance, or child problem severity could be occurring in families where the parents also have mental health challenges or low soci-economic status which contribute to both dropout and child problem severity.

2.7.4 All Definitions of Dropout

Just over a third (38%) of the sample met all three definitions for dropout. This number is at the lower end within the range of estimates of dropout in other papers, 28% to 75% (Lai et al., 1998; Luk et al., 2001). Individuals meeting all definitions of dropout attended only 5 sessions on average, over an average of 114 days. Individuals were spilt fairly evenly between receiving predominantly low intensity and medium intensity sessions.

Individuals who met all definitions of dropout were more often female, were more likely to have married parents and had low levels of involvement with CAS in comparison to those who met all definitions of dropout. These individuals look fairly similar to individuals meeting some definitions of dropout. According to the discriminant function analysis, families meeting all definitions of dropout are those where both the motivation and capability to remain in treatment

are lacking. In these cases, services seem less critical for the child (i.e., low child problem severity and risk behaviors as measured by the CANS), and neither the child nor the caregivers are capable of taking advantage of services (i.e., low child strengths and high caregiver needs).

Caregiver needs are facets of the caregiver or their life that, when high, indicate a low ability of the caregiver to support the child through mental health services (Lyons, 1999). In previous research, numerous variables that are likely captured in CANS caregiver needs items have been associated with dropout fairly consistently across studies; low socioeconomic status (Wierzbicki & Pekarik, 1993), caregiver education (McCabe, 2002), caregiver mental status and caregiver stress (Kazdin, Holland, Crowley, & Breton, 1997; Luk et al., 2001). A caregiver with low needs is able to adequately provide basic care for child and the household, be productively involved in the child's mental health service use and has the resources and supports available should they need to lean on them. For example, a caregiver with low needs has a house, they personally are in good physical and mental health, they have the ability to understand and put in place recommendations from service providers in their home, they may have a spouse or other family members who can help with child care, and have the financial resources to pay for mental health services for their child where required.

2.7.5 Some Definitions of Dropout

In total, 58% of the sample met any one or two definitions of dropout. Slightly less than a quarter (22%) met only one of the possible definitions. Within those meeting only one definition of dropout, most individuals meet only the dose definition (19% of the entire sample). On average, individuals meeting any one or two definitions of dropout attended 17 sessions over 232 days. Individuals were spilt fairly evenly between receiving predominantly low intensity and medium intensity sessions.

Families meeting only one or two definitions of dropout, show a similar low level of child need to those meeting all definitions, however, the child and caregiver are rated as having more strengths at their disposal. This is likely a family where the parents have the capacity to support their child remaining in treatment, but at a certain point may decide that they have the capacity to manage the rest of the issue on their own, or that treatment is no longer necessary. Given the low child problem severity and high caregiver strengths, this may often happen prior to 12 sessions, leading to a dropout diagnosis by the dose definition.

2.7.6 Limitations

Firstly, there are a number of factors known to impact mental health services use that were not available in the current dataset, such as family socioeconomic status (e.g. parent education level), therapeutic alliance or specific perceived barriers to treatment. Such variables could have related to classification of families into the different definitions of dropout.

Only single parent status was used to examine moderators of dose-response effect. It is possible that there are other variables (e.g., socio-economic status) which could be relevant but were not examined.

Additionally, this thesis study did not specifically investigate an attendance based definition, such as the missed last appointment definition analyzed by Warnick and colleagues. Such a definition considers families who miss their final scheduled appointment to have dropped out, regardless of the total number of sessions scheduled (Pekarik, 1992). This approach is a variant of those utilized in several previous studies in which attrition and engagement were conceptualized in terms of attendance to first, second, or third appointments (e.g., Gould et al., 1985; McCabe, 2002; McKay et al., 1996). The assumption in this definition is that the family is not sufficiently engaged in treatment and therefore less likely to keep their final scheduled

appointment, however this is a difficult assumption to verify. Similar to the clinician-rated definition, families that missed their final scheduled session may have achieved their treatment goals and did not see the need for a final appointment.

In this study, a "treatment" session was defined to include all forms of contact with the agency. Some studies assessing service use and dropout are more restrictive about what counts as a treatment session. This may limit the generalizability of our findings and impact the chosen number of session cut-offs.

Fourthly, given the data available and the reduced sample size when looking at completers who also had outcome data (i.e., a discharge CAFAS), there is a limit to the accuracy of the number of session cutoffs obtained in the need-based definition. Cutoffs were approximated using the data available. The selected cutoffs warrant verification and corroboration on larger samples and using universal outcome data.

As well, the study did not have any parent- or child-ratings of their perceptions of treatment completion or dropout. Such ratings would clarify when the clinician and family views on treatment goals and treatment completion were misaligned. Having this parent or child ratings would also ensure "completers" used to determine the optimal number of sessions for each need strata, were in fact individuals for whom there was common agreement (across the clinician and family) that treatment was complete.

Finally, data were obtained from individuals grouped within different agencies. Clustering may have influenced the findings. Unfortunately, clustering is not easily accounted for in a discriminant function analysis.

2.7.7 Implications

These results indicate that caregiver needs and child strengths are appropriate targets for engagement interventions. Recent research on engagement of children and their families in care has emphasized the role that adult caregivers play in helping a child to obtain care (Dakof, Tejeda, & Liddle, 2001) and the influence of family interactional patterns on engagement (Santisteban et al., 1996). Treatment engagement can be thought of as opposing dropout, and the consistent findings of caregiver strengths relating to engagement corroborates findings of caregiver needs as broadly related to dropout. Furthermore, the association of caregiver variables with treatment engagement offers a clear focus for interventions aimed to improve engagement with children's mental health services. Many caregiver variables (e.g., caregiver involvement in planning of and understanding of treatment, caregiver monitoring of child, caregiver residential stability) are more amenable to change than static intake demographic variables, which has been suggested as an important focus in the dropout literature (de Haan et al., 2013).

The importance of caregivers in delivering mental health services to youth has long been recognized. A family focused approach to the delivery of children's mental health services reflects an understanding of the child as embedded in a larger family system (Stroul & Friedman, 1986). From this perspective, mental health care systems should provide services to the family as a whole and involve caregivers in planning, modifying and monitoring of their child's treatment (Hunter & Friesen, 1996). Given the integral role of the caregiver in delivering mental health services to children, it is not surprising that caregiver needs are one of the defining differences between individuals who meet all definitions of dropout or no definitions of dropout. Ideally, if mental health services target the family as a whole, tackling caregiver needs alongside the child's needs, it seems the child might be more likely to stay engaged in treatment.

Family and caregiver variables have also been related to mental health service use more generally. Poverty status (Hoberman, 1992) and minority status (McKay & Bannon, 2004) have been consistently linked with an underuse and lack of engagement with child mental health services. Less researched examples of family characteristics associated with reduced service engagement include higher levels of parent and family stress (McKay & Bannon, 2004), single parent status (Armbruster & Kazdin, 1994; Brannan et al., 2003; Gould et al., 1985), higher levels of discipline effectiveness (Mckay, Pennington, Lynn, & Mccadam, 2001; Verhulst & van der Ende, 1997), and family cohesion and organization (Perrino, Coatsworth, Briones, Pantin, & Szapocznik, 2001).

Furthermore, these results argue against the commonly accepted stepped-care model of treatment (Haaga, 2000). A stepped-care model suggests applying the lowest intensity services possible and only moving to higher intensity services as needed. However, this study suggests individuals who receive services at a lower intensity than they require may be more likely to dropout. They may leave mental health care services before the stepped-care model recognizes the appropriate level of services. Instead, these results suggest a triage based system, such as those used in emergency departments for mental health (Broadbent, Jarman, & Berk, 2002; Sands et al., 2014) might be more appropriate in children's mental health. In a triage system, individuals are assessed to decide the urgency or level of need. Rather than starting everyone at the lowest possible intensity of services and then only increasing the intensity if required, a triage system would start individuals at the intensity of services indicated by the level of need at intake.

2.7.8 Future Directions

The proposed need-based definition of dropout is a novel and readily applied method to operationalize dropout both in research and in clinical practice. This definition can be applied

post-hoc, using variables routinely collected at intake. Allowing an analysis of dropout without the requirement of gathering clinician or parent ratings. This method maintains some of the advantages of the two most commonly used alternative definitions in the literature - dose and clinician judgement, while managing their disadvantages.

It would be beneficial to next examine specific predictors of dropout using the need-based definition and compare these with predictors of dropout using both dose and clinician judgment definitions. Predictors of dropout have often not been replicated (Armbruster & Kazdin, 1994; Evenson et al., 1988; Garfield, 1994; Kourany, Garber, & Tornusciolo, 1990). Differences in predictors may be due to differences in the definition of dropout. Use of a need-based definition will ideally yield a more consistent set of predictors. As well, comparison of predictors using a need-based definition to existing definitions of dropout will indicate whether this definition is capturing a distinct set of individuals than alternative definitions.

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Chapter 3

Predicting Dropout from Children's Mental Health Services:

Using a Need-Based Definition of Dropout

Kimberly Williams Dossett

3.1 The Problem of Dropout

According to data from 2011, mental health related problems incur the highest direct medical spending on a children's condition in the United States (Soni, 2014). Of the five children's conditions that require the highest direct medical spending (i.e., mental disorders, asthma/chronic obstructive pulmonary disease, trauma-related disorders, acute bronchitis/upper respiratory infections, otitis media), mean expenditure per child was the highest for mental health related problems at $US 2,465 per child (Soni, 2014). And yet despite these high costs, many children with mental health problems do not even receive specialized mental health services (Rae-Grant, Thomas, Offord, & Boyle, 1989; Zachrisson, Rödje, & Mykletun, 2006). Thus, there is a need to closely examine issues that may help to enhance efficiency of delivering mental health services.

Treatment dropout is commonly recognized as one of the significant obstacles to the delivery of effective and economically efficient mental health services. The large investments of time and resources during the intake, assessment and initial phases of treatment may not benefit the child if they dropout (Weisz, Weiss, & Langmeyer, 1987). Furthermore, staff time is used to follow up with those who discontinue, and a valuable appointment time is not utilized (Prinz & Miller, 1994). This inefficient use of services exacerbates the considerable costs and problems associated with providing mental health services (Kazdin, Mazurick, & Siegel, 1994).

On an individual level, treatment efficacy is directly related to participation in that treatment (Michelson, 1981). Children who drop out part way through treatment are less likely to improve than those who complete treatment (Prinz & Miller, 1994; Santisteban et al., 1996). When children dropout, their problems may persist, or even worsen later in life (Dulmus & Wodarski, 1996; Reis & Brown, 1999). For example, children with inadequately treated

disorders are likely to grow up to be adults who rely on mental health services (Dulmus & Wodarski, 1996; Kazdin et al., 1994; Kazdin & Wassell, 1998; Reis & Brown, 1999). Compared to children who do complete treatment, children who drop out are more likely to engage in delinquent activities, abuse drugs and alcohol, fail to graduate from highschool, and be unemployed (Lochman & Salekin, 2003; Moffit, Caspi, Harrington, & Milne, 2002).

Unfortunately, of children who receive treatment, studies find anywhere from 28% to 88% dropout (Lai, Pang, Wong, Lum, & Lo, 1998; Luk et al., 2001; Warnick, Gonzalez, Robin Weersing, Scahill, & Woolston, 2012); a dropout rate similar to that reported more than 50 years ago (Rogers, 1951). Despite considerable research investigating factors contributing to dropout, obstacles to the delivery and success of treatments remain poorly understood, and effective methods to engage and retain clients in treatment are lacking. Several studies have examined attrition in child and adolescent outpatient settings (Armbruster & Fallon, 1994; Armbruster & Kazdin, 1994; Gould, Schaffer, & Kaplan, 1985; Kazdin et al., 1994; Mckay, Nudelman, McCadam, & Gonzales, 1996; Miller, Southam-Gerow, & Allin, 2008); no single attribute appears to be sufficient to predict dropout from treatment. Furthermore, the current findings regarding the role of each of the many individual factors that are associated with dropout are inconsistent (Kazdin, Holland, & Crowley, 1997).

In the remaining general introduction, issues related to the definition of dropout will be discussed, followed by a review of the underlying theoretical model and factors related to dropout in the literature. Finally, a novel definition of dropout will be reviewed.

3.2 Inconsistencies in Definitions of Dropout

One of the primary explanations for the variability in factors contributing to dropout is inconsistency in definitions of dropout (Wierzbicki & Pekarik, 1993). In the literature, dropout

has been defined primarily in two different ways. (1) Dropout has been defined as ceasing treatment before a set number of sessions, or a specified "dose" of treatment is completed (Johnson, Mellor, & Brann, 2008). Though this provides a useful objective standard for defining dropout, this definition is likely inappropriate for use in community mental health agencies where evidence based treatments (EBTs) are not consistently offered, clients display a heterogeneous mix of diagnoses and often have comorbid problems which may lengthen the number of treatment sessions (Schoenwald & Hoagwood, 2001). (2) Dropout has also been defined as termination of treatment against clinician judgment (Wierzbicki & Pekarik, 1993). However, clinician's may use different criteria for judging the appropriateness of termination (Wierzbicki & Pekarik, 1993). Some clinicians may base their judgement on specific symptom improvement. While other clinicians may look for changes in overall functioning. As well, clinicians and clients may have differing assumptions about treatment goals and expectations (Garfield, 1994). For example, the client may end treatment because "enough" relief has been obtained, even if the criteria for "clinical improvement" or recovery have not been met (Hynan, 1990; McKenna & Todd, 1997; Todd, Deane, & Bragdon, 2003). A clinician may view this as dropout, if s/he believes that clients should achieve symptom resolution prior to ending treatment. Based on a clinician's judgement, dropout might occur at two sessions or 50 sessions, and there are likely different reasons for dropout at each of these points.

The underlying assumption in this research is that there are important differences between clients who drop out and those who complete treatment. The difficulty in finding consistent estimates of dropout prevalence or replicable differences between dropouts and completers suggests current methods of categorization are inadequate (Pekarik, 1985). Ideally, if a definition is accurately categorizing individuals as homogenous groups of dropouts or

completers, distinct and replicable differences will be found between those classified in each group. However, categorizing participants by a dose or clinical judgment definition may result in a dropout group comprised of a mixture of dropouts and appropriate terminations, as treatment completion and dropout can occur after any number of sessions (Johnson et al., 2008).

3.3 The Socio-Behavioural Model

One way to broadly conceptualize dropout as resulting from both the presence of pre-treatment factors as well as some barriers that arise early in the service seeking process is to use a classic health service use model, the Socio-Behavioral model (Aday & Andersen, 1974). Originally, this model posited three influences on service use: 1) *predisposing factors* exist prior to illness onset and describe the propensity of individuals to use services (e.g. age, sex); 2) *enabling (or inhibiting) factors* are situational variables that describe one's means to use services and can act to facilitate or inhibit service-seeking once need is perceived and a person intends to take action (e.g. socioeconomic status); 3) *need factors* refer to a patient's illness severity and can be measured through clinical status or subjective perceptions of one's own mental health (e.g. child diagnosis).

Previous studies of influences on children's mental health service use have classified factors into the three broad categories from Andersen's model (e.g., Burns et al., 2004; Ford, Hamilton, Meltzer, & Goodman, 2008). In particular, models of service use for young people emphasize the importance of the parents' perception of need in this process (Costello et al., 1998; Logan & King, 2001; Srebnik et al., 1996). Parent perception of need is very important in young children because they are unlikely to have an understanding of what emotional or behavioral symptoms may possibly benefit from professional intervention, or knowledge of professional services appropriate and/or available (Costello et al., 1998; Srebnik et al., 1996).

Although the Socio-Behavioral Model was initially developed to *explain* health service use, more often this model is interpreted as a *prediction* model (MacKian, Bedri, & Lovel, 2004). While explanatory modelling is used for testing causal explanations, this study is more concerned with predictive modelling which is used for predicting future observations given input data (Shmueli, 2010). This model may also be applicable to predictors of adherence to or dropout from children's treatment, as suggested by evidence from the dropout literature in adult mental health (Wang, 2007).

3.4 Factors Predicting Dropout by Definition

In 2012, Warnick and colleagues conducted a study comparing the predictors of dropout using different definitions applied to the same group of individuals. In their study, 1098 families receiving services for children aged 5 through 18 at an urban outpatient mental health clinic were studied to compare results of using three different definitions of dropout: (a) dose, (b) clinician judgment and (c) a definition related to the child missing their final scheduled appointment (Warnick et al., 2012). [Of note, child missing final scheduled appointment is rarely used in studies beyond its initial development (Pekarik, 1992)]. Predictors varied by definition. As well, a number of variables predicted dropout for only one definition; lower socio-economic status (i.e., receiving state-funded low-income insurance support) predicted dropout using the missed last appointment definition, having greater youth impairment predicted dropout for the clinician judgement definition and living with a non-biological family, routine intakes (as compared to urgent intakes), and longer wait times predicted dropout by the dose definition.

A recent meta-analytic review of dropout (de Haan, Boon, de Jong, Hoeve, & Vermeiren, 2013) explored predictors of dropout as they varied by definition (i.e., dose and clinician judgement types) and study design (i.e., efficacy and effectiveness studies). Some predictors of

dropout were robust across the two types of dropout definitions and two types of study designs (i.e., found in more than one of the four groups of studies with large effect sizes, or small, significant effects found in many studies). These predictors included demographic variables, child and family characteristics and features of the treatment experience (see Table 3.1).

Table 3.1.

Robust Predictors Across Both Designs and Dropout Definitions

Category of Predictors	Predictors
Predisposing Factors	Ethnic minority
Enabling Factors	Lower socioeconomic status
	Younger maternal age
	Single parent household with no father
	More parental psychiatric problems in general
	Poor parenting practices
	Lower perceived relevance of treatment
	Experiencing more stressors–obstacles that compete with treatment (e.g., scheduling conflicts, transportation)
Need Factors	Being diagnosed with an externalizing disorder
	Having more externalizing problems
Treatment Experience	More cancelations or no-shows
	Lower quality of therapeutic relationship
	Therapist being directive, controlling, confronting
	Therapist not showing care and concern
	Focus of therapy (i.e., cognitive, behavioral, interpretive)

Note: Based on results of a meta-analysis of dropout from children and adolescent mental health outpatient mental health care by de Haan and colleagues (2013).
Study Designs = Efficacy or effectiveness; Dropout Definitions =Dose or clinician judgement.

The present study examined predictors commonly collected at intake in community mental health agencies. As such, treatment-related variables were not examined. Predictors were selected based on the literature, being associated with dropout, though the significance and direction of results often differs by study. Predictors included; *predisposing* factors, (i.e., child age, and child sex; de Haan et al., 2013), *enabling* factors, (i.e., parental marital status, total number of household members, caregiver needs and strengths, and care intensity and organization; de Haan et al., 2013; Warnick et al., 2012) and *need* factors (i.e., CAS involvement, child problem presentation, child risk behaviors, and child functioning; Warnick et al., 2012; Wierzbicki & Pekarik, 1993).

3.5 Need-Based Definition of Dropout

In the current study we use a novel definition of dropout based on level of need at the start of treatment. The need-based definition recognized differences in children's need for treatment at intake and how this influenced the point at which a child should be categorized as a dropout or completer of treatment (Dossett, 2016). It has been suggested that different parent, child and treatment factors likely moderate the relation between treatment dose and therapeutic response. For example, stepped-care treatment models (Thornicroft & Tansella, 2004) rely on the idea that families with less severe problems may benefit sufficiently from smaller doses of therapy, whereas those with more severe problems may require larger doses in order to experience adequate improvement. Indeed, there is evidence to suggest severity of the child (Ruma, Burke, & Thompson, 1996) and parent psychopathology (Cobham, Dadds, & Spence, 1998; Dumas & Wahler, 1983) are negatively correlated with treatment responsiveness. As well, various clinical syndromes may require different types of treatment at varying doses, depending on the severity and persistence of symptoms (Hansen & Lambert, 2003). Researchers have

compared the differential response rates of symptom types to therapy doses and results showed that different symptoms (e.g. acute vs. chronic) improved at different rates, requiring a different number of sessions to reach a 50% response rate (Kopta, Howard, Lowry, & Beutler, 1994). Furthermore, higher levels of need (e.g., greater child symptom severity) have been consistently associated with higher children's mental health service use in community-based samples (Farmer, Stangl, Burns, & Costello, 1999; Sayal, 2004). However, individuals with higher levels of need also tend to be more likely to dropout from mental health treatment (Kazdin et al., 1994).

In a previous study, the need-based definition was developed and used to assess the prevalence of dropout in a child outpatient sample. This was compared to the use of the dose and clinician judgement definitions on the same sample. Prevalence rates of dropout were found to differ by definition, with a dose definition resulting in the highest prevalence (93.5%), a clinician judgement definition resulting in the lowest prevalence (53.3%) and the need-based definition falling in between (63.0%) (Dossett, 2016). These results suggest the need-based definition is categorizing individuals differently from alternative definitions of dropout.

3.6 Importance of Comparing Predictors by Definition

In order to prevent the negative consequences of dropout, it is important to gain knowledge of its determinants. Understanding predictors of dropout may lead to improvements in mental health services by promoting the development and evaluation of targeted interventions to retain children and families in treatment.

The aim of this study is to replicate and extend previous work comparing predictors of dropout by operational definition used. Similar to Warnick et al. (2012), differences in predictors across definitions of dropout were examined. These analyses aim to confirm that some of the inconsistencies found in the dropout literature are likely due to varying definitions.

This study extends the literature by examining predictors of a new need-based definition. It also extends the literature by examining a Canadian, rather than American, sample and assesses variables related to child risk behaviors (e.g., self-injurious behavior, aggressive behavior towards others, crime/delinquency), child strengths (e.g., child's interpersonal skills, permanence of significant relationships in the child's life, child's optimism), caregiver needs and strengths (i.e., caregiver physical/mental health, caregiver capacity for monitoring the child, caregiver social supports) and care intensity and organization (e.g., permanence of service providers, level of adult monitoring needed for child).

3.7 Objectives

The objectives are to determine predisposing (i.e., child age, child sex), enabling [i.e., parent marital status, number of household members, caregiver needs (e.g., caregiver physical/mental health, caregiver capacity for monitoring the child, caregiver social supports), and care intensity and organization (e.g., permanence of service providers, level of adult monitoring needed for child)], and *need* [(i.e., children's aid services, child problem severity, child risk behaviors (e.g., self-injurious behavior, aggressive behavior towards others, crime/delinquency), child impairment/functioning and child strengths (e.g., child's interpersonal skills, permanence of significant relationships in the child's life, child's optimism)] factors that predict children's dropout from community mental health agencies.

3.8 Hypotheses

1) The statistical significance of predictors will differ by definition of dropout used; however, there are no specific predictions in terms of what these differences will be.

2) Male sex, a single caregiver, higher number of total household members, involvement with children's aid services, child psychiatric symptoms, more child risk behaviors, and higher required care intensity and organization will predict dropout in our sample.
3) Child and caregiver strength factors will be predictive of treatment completion rather than dropout.

3.9 Methods

The current study involved secondary data analyses using data from a larger study on patterns of service use across Ontario children's mental health agencies (Reid et al., 2010). The methods of the current analyses will be described following a brief review of the methodology and key findings from the principal study.

3.9.1 Principal Study

Visit data, including visit date and nature of contact, (e.g., case management, outpatient visit, residential session) and measures of child and family functioning (i.e., the Brief Child and Family Phone Interview and the Child and Adolescent Functional Assessment Scale) were obtained from five children's mental health agencies. These agencies provided services for children ages 5-18 years old, and were accredited by Children's Mental Health Ontario or a similar body. Inclusion criteria for children were: (a) between the ages of 5 and 13 years at their first visit, (b) first visit occurred between 2004 and 2006, and (c) at least one in-person visit. Children with a pervasive developmental disorder (e.g., autism) or who were seen in a service specializing in developmental disorders were excluded. [The principal study focused on understanding service use over extended periods of time for conditions not already assumed to require on-going care.]

Patterns of service use. Using multi-level latent class cluster analysis (Vermunt & Magidson, 2002) of the visit data, five distinct patterns of service use were identified. These patterns were labeled as: Minimal (53% of children), Brief-Episodic (8%), Acute (20%), Intensive (13%), Ongoing/Intensive-Episodic (6%). Children's service use within each cluster was described in terms of number visits and duration of involvement within specific episodes of care (EoC; see Table 3.2). A minimum of three visits marks the beginning of an EoC, and a free period of 180 days without a visit signifies the end of an EoC (Reid et al., 2015).

Table 3.2.

Summary of patterns of service use across five children's mental health agencies

Pattern	N	% of all clients	Two or more episodes	Duration involvement (years)	Mean visits (over 4 years)
Minimal	2997	53%	2%	0.4	3
Brief-Episodic	447	8%	71%	3.5	29
Acute	1131	20%	4%	0.8	16
Intensive	730	13%	27%	1.8	33
Intensive-Episodic	327	6%	46%	3.3	87

Note: N= 5632 (Table from Reid et al., 2010)

Chart Reviews. Chart reviews were conducted for a stratified [age (5 to 9; 10 to 13), and sex] random sample of the target client population within each agency (n=125) within each of the five patterns of service use (N=625). Qualified research assistants reviewed charts for each of the selected clients on site at the mental health agency. Chart reviews were completed at intake (i.e., first face-to-face visit during the study period) and at the end of each EoC. Basic demographic information was recorded and the level of functioning was coded using the Child and Adolescent Needs and Strengths (CANS) scale (Lyons, 1999) at the start and end of each

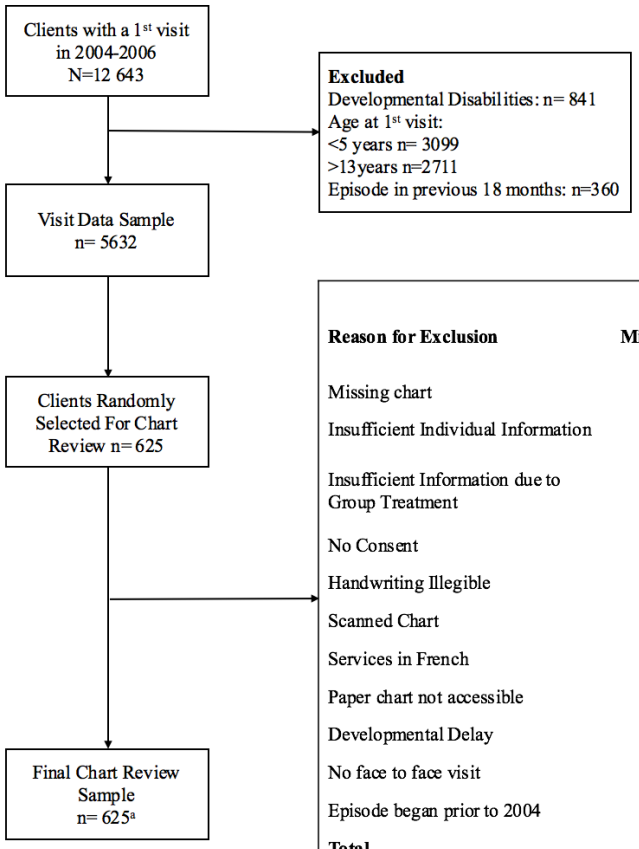
EoC. Treatment disposition at the end of each episode of care also coded. If a chart was unable to be reviewed, (e.g., the chart could not be located, or it contained insufficient individual data to complete a Child and Adolescent Needs and Strengths (CANS; Lyons, Rawal, Yeh, Leon, & Tracy, 2002) rating) another chart from the same pattern of service use was chosen for review. Figure 2.2 presents a flow diagram for the chart review data collection.

At minimum, chart reviews were completed at intake (i.e., first face-to-face visit during the study period) and where appropriate, at the end of each episode of care (EoC). Chart review ratings were made using all the information available within a specified number of sessions or number of months (see below). Chart reviews were completed at the start and end of each episode of care. When making ratings about caregivers, ideally, the caregiver(s) with whom the child is currently living were rated. If the child is not with long-term caregivers (e.g., foster care, residential treatment centre), then ratings focused on the caregiver to whom the child would be returned. If it was a long term placement, then the current caregiver was rated.

All four research assistants were trained with standardized on-line training for the CANS (Praed, 2011) and trained by an experienced coder prior to beginning the actual chart reviews. Inter-rater reliability was calculated on an ongoing basis. Approximately every fourth chart (27% of the sample) was reviewed by two or more research assistants to determine inter-rater reliability. For these charts, any discrepancies were discussed and a consensus was reached to make the final rating. Inter-rater reliability for the intake and discharge CANS ratings for 170 chart reviews (containing 0 to 3 EoC) was calculated by analyzing the consistency of ratings for individual CANS items. This was achieved by calculating a two-way mixed model intra-class correlation coefficient (ICC) with measures of absolute agreement (Shrout & Fleiss, 1979): ICC (2,4)=0.84. Percent agreement on non-CANS items in the chart review was 95.6% and overall

percent exact agreement was 92.1%.

Figure 3.1. Flow diagram of the chart review data collection.



	Pattern of Service Use				
Reason for Exclusion	**Minimal (n)**	**Acute (n)**	**Intensive (n)**	**Brief-Episodic (n)**	**Ongoing- Episodic (n)**
Missing chart	2	2	2	3	1
Insufficient Individual Information	11	8	7	11	14
Insufficient Information due to Group Treatment	2	8	8	11	5
No Consent	6	3	7	10	10
Handwriting Illegible	0	0	1	1	0
Scanned Chart	5	9	1	5	1
Services in French	0	0	1	1	0
Paper chart not accessible	3	0	2	2	3
Developmental Delay	3	5	15	7	8
No face to face visit	4	3	1	5	1
Episode began prior to 2004	0	0	0	5	2
Total	**36**	**38**	**45**	**61**	**45**

Note: No consent = individual consent for participation was not required for the study as a whole; however, if some clients had explicit, documented refusal to allow chart reviews for any reason (e.g., accreditation). In these cases, chart reviews were not conducted.
[a]Excluded charts were resampled.

3.9.2 The Current Study

Data from the chart review sample (N=625) were used to assess the predictors of dropout using various definitions, as the status of client at the end of his/her EoC (i.e., disposition at discharge) was needed in order to ascertain dropout status.

Sample

Children were aged 5-13 years (mean age= 9.4, SD=2.5) at intake; 62.2% were male. At intake, the majority of children (60.9%) had parents who were married, common law or living

together, on average, each family had a total of 4.1 household members, and the majority of children had no involvement with CAS at intake (64.2%).

Measures/Variables

Only measures and variables utilized in the current study are presented.

Predictor Variables

Demographics

Demographic variables collected included: age, sex, primary caregiver marital status (i.e., single parent, married, common-law, other, unknown), total number of household members and involvement with child welfare – the Children's Aid Society (CAS). CAS involvement was coded as: (a) no involvement, (b) investigation only (i.e., family has been investigated for reports of child abuse or neglect though no further services were provided), (b) some involvement (i.e., services were provided to a family who voluntarily participates, children remain in the home) (c) temporary care (i.e., children were placed in short-term foster or group homes), supervision (i.e., services are mandated for the family, children remain in the home), Crown Ward (i.e., child is placed under the protection of a legal guardian and is a legal responsibility of the government).

Variables used to compute outcome variables

Two variables were used to compute various definitions of dropout (see 3.8.3 Operational Definitions of Dropout, below).

Mental health service use

Visit data were from an anonymized copy of the electronic database received from each agency. Only face-to-face visits were included. Given that wide variety of interactions may improve patient's outcomes, a variety of types of contacts with the agency were considered as a "treatment" session; whether the purpose of the contact was to treat the presenting problem in the

individual or another service delivered as part of the agencies care for the child/family. This includes visits coded (Ministry of Children and Youth Services, 2010) by the primary study as an "Outpatient Visit" (i.e., drop-in resources, brief therapy, evidence-based interventions, family, group or individual counselling, or other targeted interventions), "Emergency Response" (i.e., crisis intervention or counselling, mobile crisis services, trauma crisis stabilization), "Residential Service" (i.e., hospital-based inpatient services), "Intensive Service" (i.e., foster care or wraparound services), "Day Treatment" (i.e., special education, counselling, parent training, vocational training, skill building, recreational therapy, usually lasting at least four hours a day), "Assessment" (i.e., diagnosis, intake or specialized assessments), "Respite Service" (i.e., both in and out of home services providing temporary support and relief to families and caregivers of children with mental health problems) and "Service Coordination" (i.e., case management, case conferencing and multi-professional team meetings).

For descriptive purposes, children were grouped with respect to the predominant type of services they received. Services were categorized as: Low intensity (e.g., brief therapy, intake assessment, parent training), Medium intensity (e.g., diagnosis assessment, evidence-based interventions, crisis intervention) or High intensity (e.g., case management, residential treatment, day treatment) (see Appendix A for a full list of service intensity categorization).

The percentage of treatment sessions children received in each of these three intensity categories was computed. Children were then grouped as receiving primarily Low, Medium or High intensity services (see Appendix B for a full description of intensity grouping). If a child had equal percentages of more than one intensity, then the highest intensity was used to determine overall service use intensity.

Disposition at Discharge

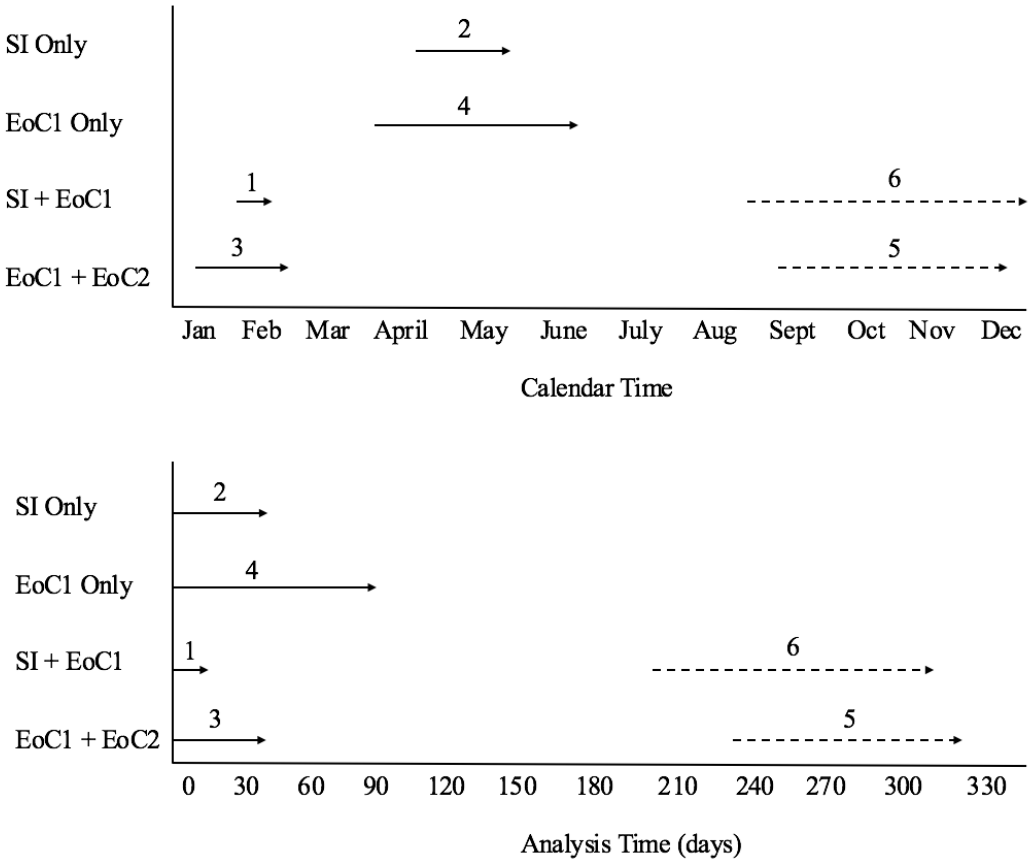
Disposition at the time of the client's last visit, at the end of an EoC (or end of involvement if the child did not have sufficient visits in the correct time frame for an EoC) was coded using all available information in the patient's file. Disposition at discharge was coded as "Family dropped out" if the family did not attend the scheduled appointment and then did not return telephone calls to rebook. In some cases, a telephone contact did occur at some point after a missed appointment and the parent may have stated a reason for dropping out (e.g., that s/he felt services were no longer needed) which was also coded. Other coding options included: "Family moved", "Refused treatment", "Treatment received and refused additional treatment", "Completed treatment" (i.e., child/family completed treatment as mutually agreed upon with service provider, usually stated in discharge report), "Referred elsewhere for treatment", or "Treatment ongoing" (i.e., additional visits after four-year study period).

For the purposes of this study, the disposition at discharge coding from the end of the first EoC was used if clients had more than one EoC. In cases where the patient had less than 3 visits in 180 days (i.e., did not have a full EoC), dropout was based on disposition at their last visit. These were referred to as the Start of Involvement (SI). Visits and dispositions at discharge coded following the first EoC (i.e., visits following a gap of more than 180 days without visits) were not analyzed.

Figure 3.2. Hypothetical data showing calendar time transformed to analysis time scale.

Four possible distributions of visit are represented. The first panel shows visits displayed in calendar time. The second panel shows how data were recoded such that Day 1 reflected the first face-to-face visit for all clients. The arrows represent multiple visits with less than 180 days between them, with the number of visits written above the arrow. The number of visits for a participant is counted from Time 0 to the end of the arrow (prior to a break of more than 180 days). Visits are grouped as an Episode of Care (EoC) if there were at least minimum of three visits in 180 days, following a free-period (time with no visits) of at least 180 days since the previous EoC. Solid lines reflect visits analyzed in the current study; dashed lines reflect visits that were excluded from analyses.

SI (Start of Involvement) Only reflects an individual who had 2 visits, the second visits being about 50 days after the first, with no visits thereafter; as this was less than 3 visits, this individual did not have an episode of care (EoC).
EoC1 Only reflects an individual with four visits within about 90 days; as this was more than 3 visits in 180 days, this individual had a single EoC.
SI + EoC1 reflects a third individual with one visit, and then more than 180 days later, has another six visits. In the case of SI + EoC1, only those visits in SI (the solid arrow) are counted, not those in EoC1 (the dashed arrow).
EoC1 + EoC2 reflects a fourth individual with three visits within about 60 days, followed by 5 visits more than 180 days later. Only those three visits in EoC1 (solid arrow) are counted, not those in EoC1 (the dashed arrow).



Child and Adolescent Needs and Strengths (CANS)

The CANS (Lyons, 1999) is a measure of needs and strengths a child/family possesses and how these should influence the design of individualized service plans. The CANS assesses domains of client functioning, five of which assess need: (a) problem presentation (e.g., oppositional behaviour, depression/anxiety, situational and temporal consistency of symptoms), (b) risk behaviours (e.g., self-injurious behavior, aggressive behavior towards others, crime/delinquency), (c) child functioning (e.g., intellectual functioning, school attendance, sexual development), (d) care intensity and organization (e.g., permanence of service providers, level of adult monitoring needed for child), and (e) caregiver needs and strengths (e.g., caregiver physical/mental health, caregiver capacity for monitoring the child, caregiver social supports);

one domain assesses strength, (f) child strengths (e.g., child's interpersonal skills, permanence of significant relationships in the child's life, child's optimism). Across all domains, a total of 50 items are scored on a 4-point scale (need domain: 0= no evidence, 1= watchful waiting/prevention, 2= action needed, 3= immediate/intensive action; strength domain: 0= strength is a center piece for child, 1= useful strength, 2= available strength, not necessarily developed, 3= no strengths). Standard protocol for completing the CANS is to code "no evidence" (i.e., 0 for problems and strengths) when there was insufficient information to complete the rating.

Reliability of this measure has been demonstrated (inter-rater reliability = .85; Lyons, Rawal, Yeh, Leon, & Tracy, 2002). CANS dimension scores have been shown to correlate with other measures of child status, such as the Child and Adolescent Functional Assessment Scale (CAFAS), indicating adequate construct validity (Dilley, Weiner, Lyons, & Martinovich, 2007).

In this study, research assistants completed the CANS using information gathered in the chart review. A study specific coding manual was developed, which involved both descriptions and examples associated with each item, to aid in inter-rater reliability of chart review coding. The CANS has been used previously in a chart review format (Anderson, Lyons, Giles, Price, & Estle, 2003). In the current study, the CANS was scored in two different ways, for two distinct uses. (1) To assess predictors of dropout by various definitions, the CANS was scored at the dimension level (similar to scoring suggestions from the developer of the measure); each of the six dimension scores were obtained by averaging the scores on all the items within that domain; this scoring reflects the specific current needs and strengths of the child and family (Lyons, 2009); Appendix C lists the CANS items sorted into dimensions. (2) Alternatively, to sort need for treatment at intake, the CANS level-of-care algorithm was used. This algorithm is used to

support and improve treatment decision making. The levels of care suggested by the algorithm include: (a) traditional clinic options (outpatient, pharmacological treatment), (b) supportive case management, (c) intensive case management, (d) home and community services, and (e) residential treatment. The CANS-based decision algorithm has been used successfully within the American service system. In Illinois when used to determine treatment needs for wards of child welfare (i.e., Department of Child and Family Services), greater improvement in clinical symptoms were recorded when treatment decisions were made using CANS recommendations (Chor, McClelland, Weiner, Jordan, & Lyons, 2012). Similarly, treatment decisions consistent with the CANS algorithm are more stable than placements which are not consistent with the algorithm recommendation, as demonstrated in the child welfare system in Tennessee (Epstein, Schlueter, Gracey, Chandrasekhar, & Cull, 2015).

3.9.3 Operational Definitions of Dropout

A summary of the three operational definitions, and the resulting prevalence rates of dropout, used in this study are presented in Table 3.3, followed by a detailed review of each definition.

Dose Definition. For this study, the dose definition used was the same criterion applied by Warnick et al. (2012) – completing fewer than 12 sessions within 16-weeks. Children who attended more than 12 sessions within 16 weeks were categorized as a “completer"; those who attended fewer than 12 sessions overall, or took longer than 16 weeks to complete 12 sessions were coded as a “dropout”.

Clinician Judgment Definition. Consistent with previous studies (e.g., Garcia & Weisz, 2002; Kazdin et al., 1994; Kazdin & Wassell, 1998; Lai et al., 1998) clinician judgement alone was used as the second definition of dropout. However, the principal study did not have explicit

ratings by clinicians at the time that families stopped treatment. Therefore, the disposition at discharge coding, which was based on clinician notes and thus captures clinician's views, was used as an indication of clinician judgement. The following disposition at discharge codes obtained in the chart reviews were combined as reflecting dropout "Family Dropped Out" (n=196), "Treatment Received, Refused Additional Treatment" (n=43), and "Refused Treatment" (n=43). All of these codes indicate the clinician felt treatment was needed and the family either did not agree and/or did not attend additional sessions. All of those individuals coded as "Completed Treatment" (n=282) were counted as completers. The following categorizes were excluded from the analyses: "Treatment Ongoing" (n=18), "Assessment Only" (n=32), "No Treatment Received" (n=15), "Moved" (n=17), and "Unknown/Other" (n=11).

Need-Based Definition. A previous paper outlines the development of the need-based definition in detail (Dossett, 2016). The need-based definition utilized (a) problem severity at intake and (b) number of treatment sessions completed to determine who was a "completer" or a dropout. First, children were categorized as being Low or High Need based on their CANS scores at intake. The CANS decision-support algorithm groups were combined as follows: (1) Low Need: Traditional clinic option, Supportive case management, (2) High Need: Intensive case management, Home and community services, Residential. Second, they were defined as having dropped out or completed based on: (a) their need category, (b) parents' marital status and (c) number of sessions completed. Individuals considered Low Need at intake who attended fewer than 8 sessions were deemed a dropout; those who completed 8 sessions or more were considered "completers". Within those considered High Need at intake, if the child had married or common-law parents and attended fewer than 16 sessions, they were deemed a dropout; if the

child had a single parent, they were categorized as a dropout if they attended fewer than 24 sessions.

Table 3.3.

Description and Prevalence of Dropout According to Each Operational Definition

Dropout Definition	Description of Dropout	Prevalence of Dropout[a]
Dose	Attending less than 12 sessions within a 16-week time frame	93.5%
Clinician Judgement	A coding at discharge indicated the child/family has dropped out, or refused treatment	53.3%
Need-Based	Low Need: Attending fewer than 8 sessions High Need & Married Parents: Attending fewer than 16 sessions High Need & Single Parent: Attending fewer than 24 sessions	63.0%

Note: N=521
[a]Normalized weighting applied.

3.9.4 Analyses

Analyses were conducted in SPSS (Version 24.0) for Windows and Stata Version 14.0. Throughout analyses, weighting was applied to ensure the subsample was representative of the principal study population. For a full description of the weighted sample characteristics compared to the unweighted sample see Appendix F. A full description of weighting procedures can be found in Appendix D. Briefly, an equal number of charts (n=25) were sampled from each of the five patterns of service use at each of the five agencies. However, in reality, the sample size for each pattern of service use differed greatly (Appendix E presents the breakdown of children by service use pattern for each agency). Inferences in the present study aimed to be applicable to the population of children receiving CAMHS. Thus, weighting was applied.

Demographic and service use characteristics of dropouts and completers as defined by each definition are described. Cohen's kappa coefficient was used to measure agreement between definitions, taking into account agreement occurring by chance.

A mixed effects logistic regression was used to model binary outcome variables (status as a dropout or a completer), using each of the three definitions of dropout, dose, clinician judgement and need-based. The following 11 factors were entered into the model using forced entry of all variables: 1) Predisposing factors: child age, child sex; 2) Enabling factors: parent marital status, number of household members, CANS Caregiver Needs and Strengths, and CANS Care Intensity and Organization dimensions; 3) Need factors: CAS Involvement, CANS Problem Presentation, CANS Risk Behaviors, CANS Functioning and CANS Strengths dimensions. Results are presented using odds ratios, confidence intervals and p-values. A mixed effects logistic regression is free of the assumptions (i.e., multivariate normality, independence, homogeneity of variance/covariance, multicollinearity, independence) of other methods such as discriminant function analysis (Tabachnick & Fidell, 2000). A mixed-effects model was used given the clustered nature of the data. Cluster-robust standard errors that permit within-cluster error correlation presume that the number of clusters is large (Cameron, Gelbach, & Miller, 2008). However, when the number of clusters are low (i.e., 5 to 30), standard asymptotic tests can over-reject (Cameron et al., 2008). Given this, overall model statistics (e.g., Wald Chi Square) are not generated. This ensures all significance estimates are conservative. Instead, adequacy of model fit was evaluated using Akaike information criterion (AIC) (Akaike, 1973) and Bayesian information criterion (BIC) (Schwarz, 1978). Both AIC and BIC offer relative measures model quality, with lower values indicating superior fit (Burnham & Anderson, 2002). Both criterion suggesting a trade-off between goodness of fit and the complexity of the model,

introducing a penalty term for the number of parameters in the model to avoid overfitting (Burnham & Anderson, 2002).

Preliminary Analyses

Demographic Data

Missing demographic data occurred in less than 5% of cases for number of household members; missing data were substituted based on families with similar marital status and CAS involvement. For example, for individuals living at home with married parents, the mean number of household members was 4; for single parent families, 3, for individuals residing under the care of CAS or in a foster or group home, 4.

Numbers of sessions flagged as a univariate outlier (greater than 3.29 times the standard deviation above the mean; Tabachnick & Fidell, 2000), were truncated at the highest value not flagged as an outlier. In total, 10 cases were identified as outliers in terms of number of sessions.

3.10 Results

3.10.1 Sample Characteristics

A summary of the demographic characteristics of the sample at intake are presented. Given small cell sizes, some categories of CAS involvement were combined. Variables are sorted according to Andersen's Socio-Behavioral Model (Aday & Andersen, 1974) of health service use (i.e., predisposing, enabling and need factors) (see Table 3.4).

Table 3.4.

Summary of Sample Demographics

Demographic Characteristics	Sample[a] % (n) or M (SD)
Predisposing Child Characteristics	
Sex (male)	62.2% (389)
Age	9.4 (2.5)
Enabling Characteristics	
Parent Marital Status	
Married/Common Law/Living Together	60.9% (381)
Single Parent	36.8% (230)
Unknown/Other	2.3% (14)
Number of Household Members	4.1 (1.2)
Need Characteristics	
Children's Aid Society (CAS) Involvement	
No Involvement	64.2% (402)
Investigation	9.7% (61)
Some Involvement	10.9% (68)
Supervision/Temporary Care/Crown Ward	15.1% (95)

Note: N=625

[a]Data have normalized weighting applied; thus, total sum of sample subgroups may not sum to sample.

3.10.2 Operational Definitions of Dropout

A summary of the operational definitions of dropout is shown in Table 3.3. Table 3.5 provides a summary of key demographic and clinical characteristics within the sample by dropout status by each definition. Overall, 38.4% of children were considered treatment dropouts across all three definitions, while only 3.2% of were ***not*** categorized as a treatment dropout by any definition. The remaining 22.2% of the population were categorized as treatment dropouts under any one of the three definitions of attrition; 36.2% were categorized as treatment dropouts under any two of the three definitions (Table 3.6). A summary of the mean number of visits for completers and dropouts using each definition can be found in Table 3.8. Figure 3.1 displays the percentage of individuals with predominately each type of service use intensity (i.e., low, medium, high) by each dropout/completion status of each definition.

Table 3.5.

Comparison of Sample Characteristics - Completers and Dropouts by Each Definition

	Dose		Clinician Judgement		Need-Based	
Demographic Characteristics	Dropout[a] N=587	Completer N=38	Dropout N=282	Completer N=246	Dropout N=332	Completer N=196
	% or M (SD)	% or M (SD)	% or M (SD)	% or M (SD)	% or M (SD)	% or M (SD)
Predisposing Child Characteristics						
Sex (male)	61.9	65.6	60.2	62.6	61.5	60.9
Age (in years)	9.3 (2.5)	10.2 (2.2)	9.6 (2.5)	9.1 (2.4)	9.6 (2.5)	9.1 (2.4)
Enabling Characteristics						
Parent Marital Status						
Married/Common Law/Living Together	61.0	58.3	59.6	62.3	58.2	65.4
Single Parent	36.8	36.1	39.2	33.8	40.5	30.3
Unknown/Other	2.2	5.6	1.1	3.9	1.3	4.3
Number of Household Members	4.1 (1.3)	4.1 (1.0)	4.1 (1.2)	4.2 (1.2)	4.1 (1.3)	4.2 (1.1)
Need Characteristics						
CAS Involvement						
No Involvement	66.7	48.2	60.5	71.1	69.3	59.1
Investigation	10.4	9.6	14.1	6.0	10.9	9.4
Some Involvement	9.3	16.9	10.0	9.6	6.3	15.7
Supervision/Temporary Care/Crown Ward	13.7	25.4	15.4	13.3	13.6	15.8
Services Received						
Number of Sessions M (SD)	10.8 (16.8)	46.4 (33.9)	10.4 (16.5)	16.3 (23.6)	4.3 (4.0)	28.3 (27.0)
Duration of Treatment	177.0 (240.6)	379.7 (302.2)	180.5 (248.9)	201.2 (251.0)	94.5 (166.4)	352.7 (282.4)
Type of services						
Low intensity	45.7	20.0	42.1	46.1	51.3	31.6
Medium intensity	40.7	62.0	43.8	40.0	35.6	53.0
High intensity	13.7	18.1	14.0	13.9	13.1	15.3

Note: CAS = Children's Aid Society.
[a]Normalized weighting applied.

Table 3.6.

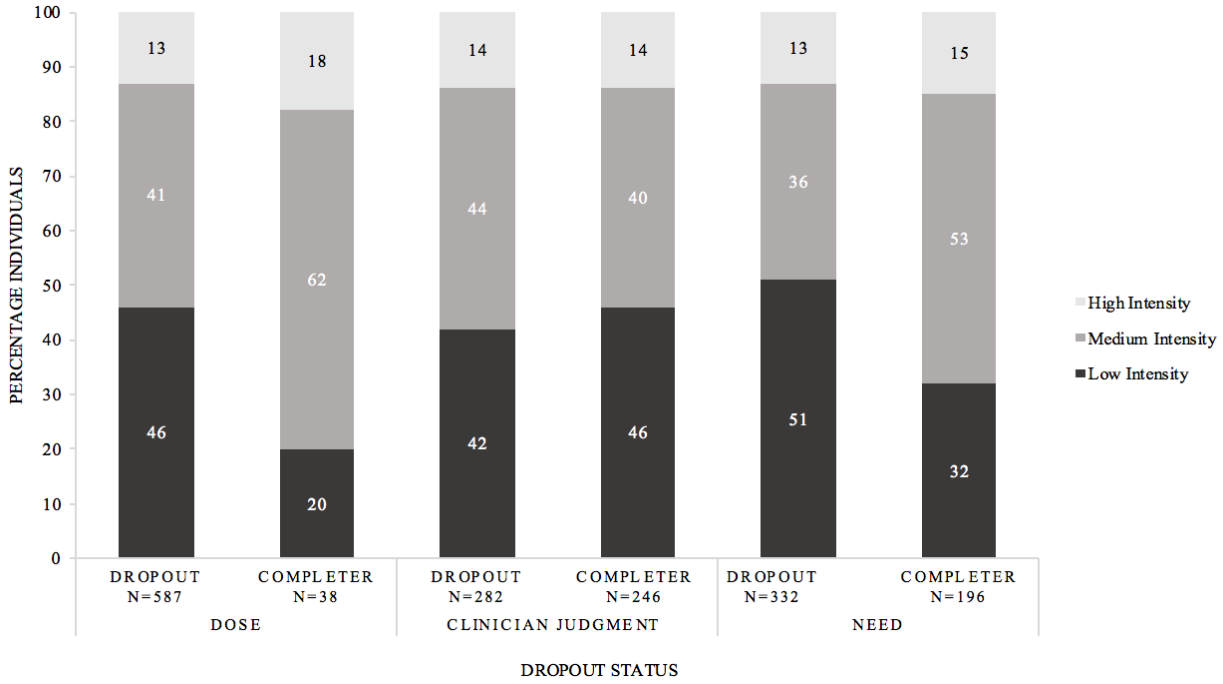
Overlap of Definitions of Dropout

Number of Definitions Met	Dose	Clinician Judgement	Need-Based	*n*	*%*
No definitions	✗[a]	✗	✗	17	3.2
One definition					
	✓[b]	✗	✗	102	19.3
	✗	✓	✗	15	2.9
	✗	✗	✓	0	0
Total meeting any one definition				117	22.2
Two definitions					
	✓	✓	✗	62	11.7
	✓	✗	✓	127	24.1
	✗	✓	✓	2	0.4
Total meeting any two definitions				191	36.2
All three definitions	✓	✓	✓	202	38.4
n	493	282	332		
%	93.5	53.3	63.0		

Note: N=521.
[a]Normalized weighting applied.
[b]✓ = Definition individuals met
[c]✗ = Definition individuals did not meet

Figure 3.3. The percentage of individuals with predominately each type of service use intensity (i.e., low, medium, high) by each dropout/completion status of each definition. Numbers shown in bars on the chart represent the percentage of individuals groups as predominately receiving each intensity of service.

Appendix A and B provide a detailed description of various combinations of types of services were used to categorize children into either low, medium, or high intensity of service use.



3.10.3 Agreement Between Definitions

Cohen's kappa was used to evaluate agreement between pairs of definitions classification of individuals as dropouts or completers (See Table 3.7). There was slight, but insignificant agreement between the dose and clinician judgement definitions of dropout, K=.006 (p=.808). Slight agreement was attained between the dose and need-based definition, K=.191 (p=.000); fair agreement occurred between the clinician judgement and need definitions, K=.213, (p=.000). A summary of the demographic details and mean number of visits for completers and dropouts using each definition can be found in Table 3.5. Figure 3.3 displays the percentage of individuals with predominately each type of service use intensity (i.e., low, medium, high) by each dropout/completion status of each definition. Specific groups were presented in further detail to understand how the need-based definition was sorting individuals different from the dose and clinician judgement definitions. Table 3.8 describes the demographic and service use characteristics of (a) individuals categorized as a completer by the need-based definition but a dropout by the dose definition, (b) individuals categorized as a completer by the need-based definition but a dropout by the clinician judgement definition, and (c) individuals categorized as a dropout by the need-based definition but a completer by the clinician judgement definition. As well, for the groups in which further reasons for dropout were known, the frequencies of these dropouts were listed in Table 3.9; (a) need-based completer but clinician judgement dropout (b) need-based dropout and clinician judgement dropout.

Table 3.7.

Categorization Agreement by Each Pair of Definitions

Dose	Clinician Judgement		Total	Cohens
	Dropout[a]	Completer	% (n)	Kappa
	%	%		
Dropout	50.0	43.4	93.4 (493)	K=.006
Completer	3.4	3.2	6.6 (35)	(p=.808)
Total	53.4	46.6	100.0 (528)	
	Dose		Total	
Need	Dropout	Completer	% (n)	
Dropout	62.6	0.4	63.0 (332)	K=.191
Completer	30.9	6.1	37.0 (195)	(p=.000)
Total	93.5	6.5	100.0 (527)[b]	
	Clinician Judgement		Total	
Need	Dropout	Completer	% (n)	
Dropout	38.8	24.2	62.9 (332)	K=.213,
Completer	14.6	22.5	37.1 (196)	(p=.000)
Total	53.3	46.7	100.0 (528)	

[a]Normalized weighting is applied.
[b]Cell count is rounded to the nearest whole number

Table 3.8.

Demographic Characteristics of Groups Sorted Similarly or Differently by Two Definitions

	Need-Based Completer but Dose Dropout N=163		Need-Based Completer but Clinician Judgment Dropout N=77		Need-Based Dropout but Clinician Judgment Completer N=128	
	M (SD) or % (n)		M (SD) or % (n)		M (SD) or % (n)	
Predisposing Child Characteristics						
Sex (male)	59.9 (98)		57.5 (44)		62.2 (79)	
Age M (SD)	8.8 (2.3)		9.5 (2.5)		9.4 (2.5)	
Enabling Characteristics						
Parent Marital Status						
Married/Common Law/Living Together	66.8 (109)		69.2 (53)		61.7 (79)	
Single Parent	29.2 (48)		28.7 (22)		36.1 (46)	
Unknown/Other	4.0 (7)		2.1 (2)		2.2 (3)	
Number of Household Members M (SD)	4.2 (1.2)		4.1 (1.2)		4.1 (1.3)	
Need Characteristics						
CAS Involvement						
No Involvement	61.6 (101)		60.1 (46)		83.0 (106)	
Investigation	9.3 (15)		11.0 (8)		3.7 (5)	
Some Involvement	15.6 (25)		16.5 (13)		4.3 (5)	
Supervision/Temporary Care/Crown Ward	13.5 (22)		12.5 (9)		9.1 (11)	
Need Group	Low Need N=120	High Need N=43	Low Need N=51	High Need N=26	Low Need N=75	High Need N=52
Number of Sessions	16.0 (13.8)	47.6 (29.0)	16.5 (13.9)	44.7 (31.8)	2.0 (1.4)	6.1 (5.0)
Duration of Treatment	264.7 (211.9)	564.9 (322)	276.8 (210.8)	523.7 (351.1)	32.0 (62.4)	110.4 (123.6)
Service Intensity						
Low Intensity	39.8% (48)	19.6% (8)	38.1% (20)	23.9% (6)	78.4% (59)	35.2% (18)
Medium Intensity	47.1% (57)	59.9% (26)	47.7% (25)	60.6% (15)	13.9% (10)	46.5% (24)
High Intensity	13.1% (16)	20.5% (9)	14.2% (7)	15.5% (4)	7.7% (6)	18.3% (10)

Note: CAS=Children's Aid Services.

Table 3.9.

Frequencies of Dispositions at Discharge

Reasons for Coding Dropout	Need-Based Completer but Clinician Judgment Dropout[a] N=77	Need-Based Dropout and Clinician Judgment Dropout N=205
	% (n)	% (n)
Reason Unknown	37.4 (29)	49.9 (102)
Some Treatment Received but Refused Additional Treatment	26.2 (20)	14.3 (29)
Services No Longer Needed	20.6 (16)	25.5 (52)
Child or Family Related Barriers[b]	9.1 (7)	6.7 (14)
Agency or Access Related Barriers[c]	6.7 (5)	3.5 (7)

[b]Child or Family Related Barriers (e.g., lack of time for treatment, child refused to go, negative reactions from family and friends)

[c]Agency or Access Related Barriers (e.g., waitlist for services, cost of services, parents disagreed with treatment approach)

3.10.4 Predictors of Dropout by Definition

Dose Definition Predictors. Based on the dose definition of dropout, 493 (93.5%) of the 521 children were coded as treatment dropouts. In a mixed effects multivariate model (See Table 3.10) for every year increase in age, children were 0.86 times less likely (95% CI [0.78, 0.96]) to dropout of treatment, children with some involvement with the CAS were 0.51 times less likely to dropout (95% CI [0.30, 0.86]) compared to children with no involvement with the CAS, for every unit increase on the CANS Problem Presentation (i.e., worse child severity) dimension children were 0.74 times less likely (95% CI [0.56, 0.98]) to dropout and for every unit increase on the CANS Caregiver Needs and Strengths (i.e., more caregiver needs) dimension children were 1.81 times more likely (95% CI [1.58, 2.07]) to dropout. (See Appendix K for all parameters in the logistic model).

Clinician Judgement Definition Predictors. According to the clinician judgement definition, 365 (53.3%) of the 521 children were coded as treatment dropouts. In a mixed effects multivariate model (see Table 3.10) for every unit increase on the CANS Care Intensity and Organization dimension (i.e., more significant care intensity and organization needs) and the CANS Caregiver dimension (i.e., more caregiver needs) children were 1.69 (95% CI [1.26, 2.28]) times and 1.57 (95% CI [1.27, 1.94]) times more likely to dropout, respectively. (See Appendix K for all parameters in the logistic model).

Need-Based Definition Predictors. Using the novel need-based definition of dropout, 332 (63.0%) of the 521 children were coded as treatment dropouts. In a mixed effects multivariate model (see Table 3.10) children with some involvement with the CAS were 0.25 (95% CI [0.09, 0.68]) times less likely to dropout than those children with no involvement with the CAS, for every unit increase on the CANS Problem Presentation dimension (i.e., worse child

severity) children were 0.81 (95% CI [0.74, 0.88]) less likely to dropout. As well, for every unit increase in age children were 1.10 (95% CI [1.04, 1.17]) times more likely to dropout of treatment, for every unit increase on the CANS Risk Behavior dimension (i.e., more child risk behaviors), CANS Caregiver dimension (i.e., more caregiver needs) and Strengths dimension (i.e., fewer child strengths), children were 1.75 times (95% CI [1.25, 2.45]), 2.09 (95% CI [1.40, 3.11]) times, and 1.28 (95% CI [1.10, 1.50]) times more likely to dropout, respectively. (See Appendix K for all parameters in the logistic model).

3.10.5 Comparing Predictors by Definitions

Table 3.10.

Logistic Regression Model Results

Predictor	Dose	Clinician Judgement	Need-Based
	OR [95% CI]	OR [95% CI]	OR [95% CI]
Predisposing Child Characteristics			
Child Age (in years)	0.86* [0.78, 0.96]	1.08 [0.99, 1.18]	1.10** [1.03, 1.17]
Boys [a]	1.34 [0.51, 3.54]	0.88 [0.66, 1.18]	1.30 [0.80, 2.13]
Enabling Characteristics			
Marital Status [b]	1.31 [0.96, 1.80]	0.93 [0.69, 1.25]	0.69 [0.26, 1.83]
Household Members	0.93 [0.80, 1.08]	0.92 [0.84, 1.01]	0.99 [0.81, 1.20]
CANS Care Intensity and Organization	0.58 [0.31, 1.07]	1.69** [1.26, 2.28]	0.63 [0.36, 1.12]
CANS Caregiver	1.81** [1.58, 2.07]	1.57** [1.27, 1.94]	2.09** [1.40, 3.11]
Need Characteristics			
CAS Involvement [c]			
Investigation	0.68 [0.35, 1.35]	2.07 [0.71, 6.01]	0.55 [0.15, 1.99]
Some Involvement	0.51* [0.30, 0.86]	0.97 [0.62, 1.51]	0.25** [0.09, 0.68]
Supervision/Temporary Care/Crown Ward	0.40 [0.15, 1.06]	1.00 [0.52, 1.91]	0.54 [0.25, 1.15]
CANS Problem Presentation	0.74* [0.56, 0.98]	0.92 [0.82, 1.03]	0.81** [0.74, 0.88]
CANS Risk Behavior	0.95 [0.64, 1.41]	0.85 [0.68, 1.05]	1.75** [1.25, 2.45]
CANS Functioning	0.92 [0.56, 1.48]	1.03 [0.86, 1.23]	0.80 [0.60, 1.07]
CANS Strengths	1.13 [0.90, 1.41]	1.08 [0.96, 1.16]	1.28** [1.10, 1.50]

Note: N=521, CAS=Children's Aid Society, CANS=Child and Adolescent Needs and Strengths Scale, *=$p<0.05$, **=$p<0.01$.
Reference categories for the predictors are:
[a] Child sex = girls.
[b] Marital Status = single parent family.
[c] CAS Involvement=No involvement.

The dose, clinician judgment, and need-based definitions differed in the pattern of statistically significant predictors. The only similar predictor across the dose and clinician judgment definitions is caregiver needs. Similarly, caregiver needs is the only similar predictor across the need-based and clinician judgment definitions. Care Intensity and Organization is a

predictor of dropout distinct to the clinician judgment definition. In fact, higher care intensity and organization predicts an increased likelihood of dropout in the clinician judgement definition. The dose and need-based definitions are more similar, sharing involvement with the CAS and increased child problem severity as predictors that decrease the likelihood of dropout. However, there are some distinct differences between the predictors by these definitions as well. definitions; however, older age predicts a decrease in the likelihood of dropout by the dose definition and an increase by the need-based definition. Similarly, marital status has opposite influences based on definition. Having married parents increases the likelihood of dropout by the dose definition and decreased it by the need-based definition. As well more child risk behaviors decrease the likelihood of dropout by the dose definition and significantly increases it by the need-based definition. Finally, fewer child strengths (CANS Child Strengths) increases the likelihood of dropout by both definitions, but is only significant for the need-based definition. See Appendix L for fit indices of regressions predicting each of the three dropout definitions.

3.11 Discussion

This discussion will review the prevalence rates and predictors of dropout by each definition, followed by an examination of the advantages and implications of the need-based definition. The discussion will conclude with a review of the limitations and future directions from this study.

3.11.1 Dropout Prevalence Rates by Definition

Dose Definition. Dropout prevalence rates for the dose definition were remarkably high (93.5%), though not dissimilar to the prevalence rates found by Warnick and colleagues when the same dose definition was applied to a sample of similar age, receiving services at an urban outpatient mental health clinic in the U.S. (88.1%). These high prevalence rates are difficult to

reconcile with the fact that the majority of children who received CAMHS from agencies in Ontario, and completed the CAFAS, demonstrate improvement following treatment (Barwick & Vlad, 2015). This underscores the most notable drawback of a dose definition of dropout; not all youth likely require the same number of sessions to manage their mental health challenges. For example, Warnick and colleagues found that 31.3% (N= 344) of the cases who attended fewer than 12 sessions in 16 weeks (dropouts by the dose definition) were not identified as treatment dropouts by the clinician judgement definition. A similar finding was obtained in this study, where 43.4% (N=229) of the sample was considered a dropout by the dose definition, but not by the clinician definition. This suggests there are many individuals for whom receiving less than 12 sessions is deemed sufficient by the child's clinician.

De Haan and colleagues (2013) reported a range of prevalence rates using various dose definitions of dropout in effectiveness studies that were much lower (e.g., 17% - Miller et al., 2008, 29% - McCabe, 2002, 52% - Peters et al., 2005, 69% - Baruch et al., 2009). These prevalence rates are much lower than the dropout rate found in this study and by Warnick et. al, which may be due to the fact that dose definitions are not commonly applied to effectiveness studies. In the cases where it has happened, as noted above, the cutoff for dropout is often considered to be not attending past the first session, suggesting that the specifics of the study (e.g., RCT, community sample) and the dose definition (i.e., specified number of sessions to complete treatment) will impact the dropout prevalence rate. Given the heterogeneity of individuals receiving services in community outpatient settings, it seems unlikely a single dose definition will ever be suitable for all individuals in such a sample. Instead, a dose definition is likely only suitable in RCT's, where the sample is more homogenous and the treatment has a specified length and material to cover from the outset.

A need-based definition may be appropriate when applied to an RCT as well as an effectiveness study. A need-based definition can suggest different cutoffs for individuals with different levels of need at intake in a community sample, as in this study. As well, a need-based definition might add useful distinction between high and low need individuals even within an RCT. For example, in an RCT of a treatment with a maximum length of 16 sessions, a need-based definition may be used to determine which low need individuals will suffice with only half the treatment, whereas which high need individuals will require the entirety of the treatment.

Clinician Judgment Definition. Dropout prevalence by the clinician judgement definition was 53%; lower than for the dose definition but similar to the rate of clinician-rated dropout reported by Warnick et. al. (2012). Other studies using a clinician judgement based definition in outpatient settings had similar findings: 45% - Armbruster & Fallon, 1994, 48% - Kazdin & Mazurick, 1994, 49% - Johnson et al., 2008, 67% - Dierker, Nargiso, Wiseman, & Hoff, 2001. There is considerably greater consistency in the dropout prevalence rates in the literature using clinician judgement of dropout compared to the dose definition. This consistency is likely greater as it is very clear when a client stops coming to treatment. However, it is still unclear how many of the clients classified as dropouts actually were no longer in need of services. In most studies using a clinician judgement definition it is unclear how the clinician is coming to their judgement about the client no longer needing services and different clinicians may use varying criteria for judging the appropriateness of termination (Wierzbicki & Pekarik, 1993). For example, the client may end treatment because "enough" relief has been obtained, even if the criteria for "clinical improvement" or recovery have not been met (Hynan, 1990; McKenna & Todd, 1997; Todd et al., 2003). A clinician may view this as dropout, if s/he believes that clients should achieve symptom resolution prior to ending treatment. This lack of

clarity and objective standardization makes this a more difficult definition to use across research studies.

The results from studies of the barriers experienced during treatment (Kazdin, Holland, Crowley, & Breton, 1997; Kazdin, Holland, & Crowley, 1997; Kazdin & Wassell, 2000), as well as suggestions from studies of mental health service use and dropout (Hynan, 1990; McKenna & Todd, 1997; Todd et al., 2003), indicate that parents likely have different ideas than a therapist about when their child has already benefited enough from therapy. This can cause confusion as to whether these individuals should be considered a dropout or completer of treatment. In most studies until now, these patients have been classified as dropouts as the opinion of the therapist was used as the criterion in the dropout definition.

Corroborating this idea, the need-based definition resulted in a higher dropout prevalence rate than the clinician judgement definition in our sample, which suggests that there are also some individuals for whom the clinician may be underestimating the continued need for services. For example, some families may have achieved their treatment goals but these goals were not shared by the clinician. In 20%-25% of cases, the family believed services were no longer needed, regardless of whether the need-based and clinician judgment definition sorted the individual similarly (i.e., both categorized the individual as having dropped out) or not (i.e., need-based completer and clinician judgement dropout). In such situations, the clinician may have considered the discharge to be unplanned, while the family did not. Thus, this individual would be categorized as a dropout by the clinician judgement definition, while the need-based definition may instead sort this individual as a completer.

Need-Based Definition. Dropout prevalence by the need-based definition was 63%; higher than the clinician judgement definition, but lower than the dose definition. There were no

individuals meeting only the need-based definition, suggesting this definition is capturing similar ideas to existing operational definitions of dropout. The need-based definition is in essence a more refined version of the dose definition, as it applies a number of session criteria in a more nuanced manner. The need-based definition should identify individuals who attend a small number of sessions (e.g., 12-16 sessions) but for whom this is not sufficient and as well, the need-based identified individuals who attend a small number of sessions (e.g., less than 12 sessions) but for whom this is sufficient.

There are a sizable number of people who meet both the dose and need definitions, but not the clinician judgement definition (24.1% of the entire sample). As previously stated, this may reflect inconsistency in the ways in which clinicians judge clinical improvement or what therapeutic goals they hold. Alternatively, it may simply indicate that although some of these children may not have required the additional psychotherapy services, others may have benefitted from a full dose of therapy (Warnick, 2012). However, kappa results were strongest for the agreement between the need-based and clinician judgment definitions. Therefore, although the need and clinician judgement definitions do not appear to have much overlap (0.4%), this is likely masked by the sheer number of individuals who simultaneously meet the dose definition. It is reasonable that the majority of the individuals that would be deemed as terminating prematurely by the clinician judgement definition and who attend fewer sessions than indicated by their intake level of need, would also have attended fewer than 12 sessions in 16 weeks, given how rare it was to achieve this standard.

3.11.2 Service Use Comparisons Across Definitions

Dropouts attended fewer sessions than completers, regardless of definition used. However, the difference between the number of sessions attended for dropout and completers

was quite small in the clinician judgement definition (10 vs. 16, respectively) versus the dose definition (11 vs. 46) and need-based definition (4 vs. 28). This is not surprising given that clinician judgment is the only definition where number of sessions attended is not inherent in the definition of a dropout. The number of sessions dropouts attended was similar across the dose and clinician judgment definitions, whereas dropout by the need-based definition attended far fewer sessions on average. Correspondingly, the duration of treatment was similar across dropouts from the dose and clinician judgment definitions, though much shorter for dropouts from the need-based definition. This suggests there are individuals identified as dropouts by the dose definition, who attend a small number of sessions (between 4 and 10) but for whom this is sufficient (completers as judged by the need-based definition). At the other end, completers by the need-based definition attend more sessions that completers by the clinician judgement definition. This suggests clinicians may be underestimating how much treatment clients need in some cases.

In terms of type of services used, dropouts by the clinician judgement definition use very similar intensity services to completers. Dropouts by both the dose and clinician judgement definitions predominately use services classified as low intensity, while completers predominately use medium intensity services. This suggests the type of treatment received may be important in addition to how much treatment is received. In community mental health agencies, a stepped-care model is often adopted (Thornicroft & Tansella, 2004). A stepped-care model suggests applying the lowest intensity services possible and only moving to higher intensity services as needed (Haaga, 2000). It is possible that those categorized as completers by both the dose and need-based definition were given higher intensity services more quickly. Higher intensity services may have had better outcomes or felt more valuable to families and

thus they were less likely to dropout. In particular, it appears the need-based definition may show the best match between both amount and type of services used. There is a much wider difference between dropouts and completers in terms of intensity of services used with the need-based definition compared to the dose definition.

3.11.3 Advantages of a Need-Based Definition

Although the dose definition is clear and easily applied, it is reasonable to expect that not all children will require the same number of sessions (i.e., 12 sessions within 16 weeks) in order to improve. Therefore, it is likely that using a pure dose definition, some families are likely to be misclassified as dropouts, or as completers. In fact, given that some children may require fewer sessions, this definition of dropout could lead to treatment engagement interventions which are costly and inefficient, if widespread rather than targeted appropriately. It is likely that different parent and child factors moderate the relation between treatment dose and therapeutic response. For example, as seen in stepped-care models (Thornicroft & Tansella, 2004), families with less severe problems may benefit sufficiently from smaller doses of therapy, whereas those with more severe problems may require larger doses to experience equal improvement (Haaga, 2000). This notion is supported by evidence that severity of the child (Ruma et al., 1996) and parent (Cobham et al., 1998; Dumas & Wahler, 1983) psychopathology is negatively correlated with treatment responsiveness. Thus when analyzing dropout, (inherently related to the dose-response effect of treatment) it may be particularly important to consider initial severity of the child psychopathology and presence of parental psychopathology as potential moderators of treatment efficacy, and thus the optimal number of sessions someone should attend, and before which they should be considered a dropout (Nock & Ferriter, 2005).

The clinician judgement definition is more idiographic than a dose definition. However, the clinician and the family may not share the same treatment goals, and thus what is considered a dropout by the clinician's opinion may be an inappropriate classification. Furthermore, the way each clinician is rating dropout can vary, leading to a lack of clarity and standardization in using this definition.

The need-based definition maintains the objective standard based on number of sessions, but takes into account differences in the individual. In this sense it captures a middle ground between the dose definition and the clinician judgement definition. This definition, similar to a stepped-care model, could add nuance to the dose definition making it more efficient. As well, it reflects the notion that standards other than the clinician's opinion (e.g., parent opinion, objective measures) may be valuable in the assessment of dropout. In fact, Warnick and colleagues suggest that future research may examine a combination of approaches when defining dropout. Similarly, de Haan and colleagues also suggested that the ideal definition of dropout would combine the opinion of the clinician and the parent as to whether treatment goals have been achieved, as well as an objective measure or progress towards therapy goals. The proposed need-based definition moves in this direction by basing the number of sessions off an objective assessment of outcome, along with the opinion of the therapist.

3.11.4 Predictors of Dropout

The aim of this study was to compare predictors of dropout by varying definitions, including a need-based definition. Each variable significantly related to dropout will be discussed in turn.

Age. Age was found to predict dropout by both the dose and need-based definitions. These two definitions rely more heavily on a set number of sessions, so a factor that decreases

the number of sessions attended would be associate with dropout. For example, evidence suggests that once in services, younger children tend to use less services (Realmuto, Bernstein, Maglothin, & Pandev, 1992). Interestingly, in the dose definition, dropout was predicted by younger age whereas in the need-based definition it was predicted by older age. The literature has found mixed evidence for the impact of age on dropout. In a similar study comparing predictors of dropout by various definitions, age was not found to predict dropout by either dose or clinician judgment definitions (Warnick, 2012). The recent meta-analytic review by de Haan and colleagues found that older age was a predictor of dropout, only in efficacy studies that used a dose definition of dropout (2013). This does not match our finding with dose definition, but instead matches our need-based definition findings. It appears that older age is a predictor of dropout by the dose definition in efficacy studies (de Haan et al., 2013) and younger age is a predictor of decreased services use (Realmuto et al., 1992) and dropout by the dose definition (as found in our study) in effectiveness studies. Younger children may rely more heavily on their caregivers to facilitate continuation of service use. As noted in this study, caregiver needs and obstacles to treatment influence dropout, which may be particularly relevant in effectiveness studies where treatment attendance may not be supported as well as it might be in RCTs. The need-based definition finding older age predicts dropout in our study may suggest that parents feel they can manage better and/or sooner and can communicate better with the child which helps them feel like they can manage.

CAS Involvement. Some involvement with CAS was found to predict dropout for the dose and need-based definition as compared to no involvement with CAS. Up to 50% of children seen in child welfare settings have a psychiatric disorder and these children's problems and life situations are likely to be complex, pointing to a high need for mental health services (Burns et

al., 1995). However, in an outpatient sample, child welfare involvement was not found to be a predictor of dropout across any of the three definitions studied (i.e., dose, clinician judgment, missed last appointment) (Warnick et al., 2012). Very high levels of involvement with CAS (e.g., supervision, temporary care, crown ward) were not found to predict dropout, however this group had small sample sizes.

Problem Presentation. Severity of child symptoms has been inconsistently related to dropout (e.g., Gonzalez, Weersing, Warnick, Scahill, & Woolston, 2011; Kazdin & Wassell, 2000; Miller et al., 2008). In part this may be due to differences between the influences of varying types of symptoms on dropout (e.g., internalizing vs. externalizing) and of different raters of symptoms (e.g., parent vs child's rating of own symptoms) across studies. In a recent meta-analysis, more child externalizing problems, as rated by a parent or teacher, predicted dropout overall, across both dose and clinician judgment definitions and both efficacy and effectiveness studies (de Haan et al., 2013). However, this was driven exclusively by more child externalizing problems predicting dropout in effectiveness studies, across both definitions. A dose definition is not commonly used in effectiveness studies; when it is, the dose definition is often failure to attend after the initial appointment (de Haan et al., 2013). This differs greatly from the dose definition used in this study, attending fewer than 12 sessions in 16 weeks. This difference may contribute to why higher child severity predicted dropout by a dose definition in the literature, but did not in our study. In the study by Warnick et. al, (2012), more child externalizing problems, and more child internalizing problems predicted dropout by the exact same dose definition as used in our study; however these ratings were judged by the child themselves. In the meta-analytic review (de Haan et al., 2013), ratings of child internalizing and externalizing problems predicted dropout differently depending on if they were rated by a

parent/teacher or the child. Finally, in our study the measure of child problem severity combines both internalizing and externalizing symptoms, which may affect our results in comparison to the literature (see discussion – 3.10.4 Limitations).

Risk Behaviors. In this study, higher child risk behaviors increase the risk of dropout according to only the need-based definition. Child risk behaviors have not been studied specifically in the dropout literature. The most closely related variables are likely externalizing symptoms and contact with deviant peers, both of which may increase the likelihood of a child being involved in violence, delinquency and other risk behaviors. Both externalizing symptoms and contact with deviant peers have been found to predict dropout across both dose and clinician judgement and across both efficacy and effectiveness studies (de Haan, 2013). The presence of child risk behaviors might indicate a family where attending treatment is too much of a burden (e.g., parents who are unavailable to supervise the child adequately may also lack availability to ensure treatment attendance) and treatment attendance is more difficult (e.g., a child who runs away, or is uncompliant with authority). However, these behaviors suggest the child is in high need of services (i.e., numerous sessions), which is likely why this predicts dropout by the need-based definition. As these children are likely high need and therefore require 16 or more sessions according to our data, it is not surprising that risk behaviors were not a significant predictor by the dose definition. In terms of a clinician judgement definition, risk behaviors may not factor in to a clinician's judgement of treatment completion, depending on treatment goals. Therefore, depending on how the clinician is judging treatment completion, risk behaviors would not necessarily predict dropout.

Child Strengths. In this study, lower child strengths increase the risk of dropout according to only the need-based definition. Child strengths have not been studied specifically in

the dropout literature. The closest variable commonly studied is child social functioning. In a recent meta-analysis, child social functioning predicted dropout in effectiveness studies using a clinician judgement definition. However, social functioning is not identical to child strengths. Social functioning is also captured in other scales of the CANS (i.e., CANS Child Functioning dimension) and social functioning is only one fact of child strengths. Lower child strengths only predict dropout by a need-based definition, likely as this is the only definition that specifically takes into account how treatment will affect different children differently.

Care Intensity and Organization. The construct of care intensity and organization covers four somewhat disparate ideas (i.e., amount of adult monitoring the child needs, the intensity of treatment needed for the child, transportation required to get the child to treatment and the stability of the service providers who work with the child). Care intensity and organization factors predicted dropout only by the clinician judgement definition. These factors might be the types of things a family would discuss with the clinician, so the clinician would be more likely to know if these issues were driving the family to stop attending. Neither a duration or treatment based definition, nor an analysis of need at intake are likely able to capture these factors.

Caregiver Needs. Across all definitions, the only consistent predictor was caregiver needs. Caregiver needs are facets of the caregiver or their life that when low can act as a resource to the child, but when high indicate an inability of the caregiver to support the child through mental health services (Lyons, 1999). A caregiver with low needs is able to adequately provide basic care for the child and the household, is able to be more involved in the mental health services the child is receiving, and has the resources and supports available should they need to lean on them.

In a meta-analytic study of dropout from children's mental health, overall across both definition types measures (dose and clinician judgement) and both study types (efficacy and effectiveness), both number of total parent problems and poor parenting were significant predictors of dropout (de Haan et al., 2013). These variables tap into the construct of caregiver needs, highlighting the issues caregivers are facing which limit their ability to meet the child's basic and mental health specific needs.

3.11.5 Implications

Results from this study may also be used to inform targeting and development of treatment engagement interventions for children and their families. Engagement is often defined as initial attendance to treatment and then retention over time (Gopalan et al., 2010). Some definitions theoretically suggest engagement also involves emotional investment beyond simple participation (Staudt, 2007; Yatchmenoff, 2005). However, regardless of attitudinal portions of the definition, engagement is primarily measured by attendance.

Most of the research on predictors of engagement has mapped well onto predictors of dropout. For example, poverty, minority status, single parent status, the child having a diagnosis, elevated family distress levels and family level psychosocial problems have all been found to contribute to lower engagement (Ingoldsby, 2011). Many of these factors are related to the family or caregivers. The current study discovered that caregiver needs predicted dropout across all definitions. As well, our current study suggested that lower levels of psychiatric symptomatology predict dropout across the dose and need-based definitions, which maps on to the finding of a diagnosis being associated with engagement. These results suggest the individuals that should be targeted for engagement interventions are those children with less severe symptomatology and families where the caregivers have high levels of need (e.g.,

caregiver physical or mental health problems, caregiver's knowledge and understanding of child's strengths, problems and treatment).

This study also suggests what the engagement programs should be designed to impact. There are some interventions aimed at improving engagement with children's mental health services (Ingoldsby, 2011). Such interventions include reminders via letters, telephone calls or text messages, strategies to improve the first contact with the agency (by phone or face-to-face), web-based appointment booking/confirmation programs, providing therapy in schools or at home, addressing parental concerns throughout therapy, family advocate support programs and peer youth specialists. Many of these appear to be targeting barriers to treatment, however there is a distinction between barriers and pre-existing predictors. To best address dropout, targeted engagement should aim to impact barriers and pre-exiting predictors amenable to change. Our current study suggests there may be caregiver pre-treatment variables which can be targeted along with reminders and support to manage barriers (e.g., impacting parental mental or physical health, housing aid to increase residential stability, support in organizing a household, involvement in the planning process, and training to improve knowledge of children's strengths/problems and ability to supervise the child adequately).

3.11.6 Limitations

The current study has some limitations which must be acknowledged. As this study was a secondary data analysis, the intake chart review data did not offer all the ideal variables for this study. It is likely key predictors were not evaluated. For example, this study did not provide information on ethnicity or socioeconomic status, which have both been associated with dropout in previous research (Luk et al., 2001; McCabe, 2002; Warnick et al., 2012). Furthermore, this study did not have data on variables related to the treatment process. For instance, this study did

not have data on parent's experience of barriers to treatment (Kazdin, Holland, & Crowley, 1997; Luk et al., 2001) or measures of therapeutic relationship (Garcia & Weisz, 2002; Robbins, Turner, Alexander, & Perez, 2003) which have been shown to greatly impact treatment attendance and adherence.

Severity of child problems was indicated by a single CANS scale, instead of looking at symptom types separately (e.g., externalizing vs. internalizing). Given the small number of items indicating child symptoms (i.e., CANS items 1-10) and the heterogeneous externalizing and internalizing symptoms which may appears under single CANS items (e.g., emotional control, adjustment to trauma), it seemed inappropriate to delineate this single dimension. Furthermore, original scoring methods (Lyons, 1999) suggest the CANS can be interpreted on a single item or dimension basis (i.e., CANS child problem presentation dimension), however there is no proven psychometric validity of splitting the dimension into internalizing and externalizing symptom groups.

Additionally, the data in the principal study were obtained from individuals grouped within different agencies. As such, it is possible clustering may have influenced the findings. Regrettably, accounting for clustering in the mixed effects logistic regression limited our ability to achieve overall model chi square statistics to assess model fit. However, it was important to make efforts to control for the clustered nature of the data to avoid erroneously small standard errors, and thus an inflated possibility of type I error.

Furthermore, comparisons to existing definitions of dropout are limited to dose and clinician judgment definitions. This study did not specifically investigate an attendance-based definition, such as the missed last appointment definition analyzed by Warnick and colleagues. Attendance-based definitions consider families who miss their final scheduled appointment to

have dropped out, regardless of the total number of sessions scheduled (Pekarik, 1992). This approach is a variant of those utilized in several previous studies in which attrition and engagement were conceptualized in terms of attendance, in particular for the first, second, or third appointments (e.g., Gould et al., 1985; McCabe, 2002; McKay et al., 1996). The underlying assumption is that the family is not sufficiently engaged in treatment and is therefore less likely to keep their final scheduled appointment. Unfortunately, this is a difficult assumption to verify. Similar to the clinician-rated definition, families that missed their final scheduled session may have achieved their treatment goals and did not see the need for a final appointment.

In addition, the limitations of the secondary data impact the accuracy of our need-based definition cutoffs. The sample with outcome data (i.e., a discharge CAFAS) was only a portion of the entire sample, and in particular cases was quite small. This introduces a limit to the accuracy of the number of session cutoffs obtained in the need-based definition. Cutoffs were approximated using the data available, however, assumptions and connections to the literature had to be made, in particular to surmise a cutoff for the high need individuals with single parents. The selected cutoffs warrant verification and corroboration on larger samples and using universal outcome data.

3.11.7 Future Directions

It is likely that static pre-treatment variables, as well as dynamic barriers experienced during treatment, together predict dropout. Going forward, research on dropout should be expanded to examine process-oriented variables (e.g., therapeutic alliance, perceived barriers to treatment), decision making processes and other mechanisms that lead to dropout. It is reasonable to assume these factors interact with existing pre-treatment factors which make a family vulnerable to dropout. This will suggest areas to influence and target for intervention.

Most notably, the results of this study confirm the association of factors with dropout from children's mental health services varies with the definition of dropout. In this light, it is important for researchers to be aware of the impacts of the definition they have chosen and document the methodology used to define dropout.

It may be the case that a need-based definition provides a superior method for defining dropout from youth mental health services, or it may provide an alternative definition relevant in particular situations. Findings from this study and others (de Haan et al., 2013; Warnick et al., 2012) suggest there may not be a single ideal definition of dropout, but rather, the definition chosen must be relevant to the question being asked.

Eventually, with increased understanding of dropout and the factors that predict it, we should be able to target programs to increase engagement and retention of children involved with mental health services. Reducing dropout through such programs would benefit children, their families and the mental health agencies that serve them.

3.12 References

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Chapter 4

General Discussion

Kimberly Williams Dossett

4.1 Discussion Overview

The purpose of these studies was to extend the literature pertaining to dropout from children's mental health services. Chapter 2 suggested a novel need-based definition of dropout, which offered advantages compared to existing definitions. Chapter 3 looked at the predictors of dropout according to the need-based definition and compared those to predictors of dropout using existing definitions. These results, as they pertain to study objectives, will be briefly summarized and a discussion of limitations, implications, and conclusions will follow.

4.2 Need-Based Definition of Dropout

The first goal of this thesis was to develop a novel definition of dropout from children's mental health services that would rectify some of the issues with current operational definitions of dropout and suggest a data-driven alternative amidst the definitional variability in the dropout literature. The current study proposed a need-based definition, which suggests the optimal number of sessions required should vary based on a client's level of need at intake. Dropout is then defined as receiving significantly lower than the optimal number of sessions.

Results suggest the need-based definition produces a dropout prevalence rate (63%) in the expected range based on the existing literature (28%-88%). In this study, the need-based definition resulted in a prevalence rate lower than the dose definition (93%) but higher than the clinician judgement definition (53%). A dose definition is generally defined as ceasing treatment before a set number of sessions, or a specified "dose" of treatment is completed (Johnson, Mellor, & Brann, 2008). A clinician judgement definition is most commonly defined as using the clinician's judgment of the appropriateness of termination as the criterion (Wierzbicki & Pekarik, 1993).

Dropouts attended fewer sessions than completers, regardless of definition used. However, the difference between the number of sessions attended for dropout and completers was quite small in the clinician judgement definition (10 vs. 16, respectively) versus the dose definition (11 vs. 46) and need-based definition (4 vs. 28). This is not surprising given the clinician judgment definition is the only one where number of sessions attended is not inherent in the definition of a dropout. The number of sessions dropouts attended was similar across the dose and clinician judgment definitions, whereas dropout by the need-based definition attended far fewer sessions on average. Correspondingly, the duration of treatment was similar across dropouts from the dose and clinician judgment definitions, though much shorter for dropouts from the need-based definition. This suggests there are individuals identified as dropouts by the dose definition, who attend a small number of sessions (between 4 and 10) but for whom this is sufficient (completers as judged by the need-based definition). At the other end, completers by the need-based definition attend more sessions that completers by the clinician judgement definition. This suggests clinicians may be underestimating how much treatment clients need in some cases.

In terms of type of services used, dropouts by the clinician judgement definition use very similar intensity services to completers. Whereas, dropouts by both the dose and clinician judgement definitions predominately use services classified as low intensity, while completers predominately use medium intensity services. This suggests that the type of treatment received may be important in addition to how much treatment is received. In community mental health agencies, a stepped-care model is often adopted (Haaga, 2000). A stepped-care model suggests applying the lowest intensity services possible and only moving to higher intensity services as needed (Haaga, 2000). It is possible that those categorized as completers by both the dose and

need-based definition were given higher intensity services more quickly. Higher intensity services may have had better outcomes or felt more valuable to families and thus they were less likely to dropout. In particular, it appears the need-based definition may show the best match between both amount and type of services used. There is a much wider difference between dropouts and completers in terms of intensity of services used with the need-based definition compared to the dose definition.

The need-based definition appears to be capturing individuals who attend a small number of sessions (and thus would be deemed a dropout by a dose definition) but for whom this is sufficient (i.e. those with minimal issues to work through or strong supports/protective factors in place). The need-based definition resulting in a higher dropout prevalence rate than the clinician judgement definition suggests that there are also some individuals for whom the clinician may be misjudging the continued need for services. For example, the client may end treatment because "enough" relief has been obtained, whether or not criteria for "clinical improvement" or recovery have been met (Hynan, 1990; McKenna & Todd, 1997; Todd, Deane, & Bragdon, 2003). A clinician may view this as dropout, while the need-based definition categorized this individual as a completer. For example, some families may have achieved their treatment goals but these goals were not shared by the clinician. In 20%-25% of cases, the family believed services were no longer needed, regardless of whether the need-based and clinician judgment definition sorted the individual similarly (i.e., both categorized the individual as having dropped out) or not (i.e., need-based completer and clinician judgement dropout). In such situations, the clinician may have considered the discharge to be unplanned, while the family did not.

The need-based definition used three need strata. The three need strata mapped on to intensity of services received, the number of sessions attended and duration of treatment,

bolstering this method of sorting need. Those categorized as higher need, regardless of parental marital status, attended sessions predominately classified as medium intensity. Comparatively, individuals categorized as low need attended sessions predominately classified as low intensity.

A very small percentage of the sample met no definitions of dropout (3%) – in other words, only 3% of the sample could be identified as completing care. It would appear that either our system is currently very unsuccessful at retaining youth with mental health problems in services, or the ways in which dropout is being defined are inconsistent, and possibly inadequate. Individuals who met no definitions of dropout attended many more sessions on average (49) than individuals who met only one or two definitions (M=17) or all definitions of dropout (M=5). Majority of individuals (60%) meeting no definitions of dropout received predominantly medium intensity services.

Families meeting no definitions of dropout seem to have children who are in strong need of mental health services (i.e., high child problem severity and risk behaviors as measured by the CANS). Children with psychological disorders (Bums et al., 1995; Offord et al., 1987; Zahner, Pawelkiewicz, DeFrancesco, & Adnopoz, 1992) and functional impairments (Bird et al., 1996) are more likely to use mental health services. However, importantly, this high need is paired with capable caregivers (i.e., low caregiver needs as measured by the CANS) and a child able to take advantage of services (i.e., high child strengths as measured by the CANS). Essentially, this suggests a family with both the motivation and capability to continue in treatment. Children do not make decisions about seeking or remaining in mental health services alone, it is caregivers who do this.

Just over a third (38.4%) of the sample met all three definitions. Individuals meeting all definitions of dropout attended only 5 sessions on average. Individuals were spilt fairly evenly

between receiving predominantly low intensity and medium intensity sessions. According to the discriminant function analysis, families meeting all definitions of dropout are those where both the motivation and capability to remain in treatment are lacking. In these cases, services seem less critical for the child (i.e., low child problem severity and risk behaviors as measured by the CANS), and neither the child nor the caregivers are capable of taking advantage of services (i.e., low child strengths and high caregiver needs).

The fact that so much of the sample meets more than one definition of dropout suggests the need-definition is sorting individuals similarly to the other definitions. In fact, there were no individuals meeting only the need-based definition, suggesting this definition is capturing similar ideas to existing operational definitions of dropout. In particular, the need-based definition is in essence a more refined version of the dose definition, as it applies the number of session criteria in a more nuanced manner. Corroborating this idea, there are a sizable number of people who meet both the dose and need definitions, but not the clinician judgement definition (24.1% of the entire sample). However, kappa results were strongest for the agreement between the need-based and clinician judgment definitions. Therefore, although the need and clinician judgement definitions do not appear to have much overlap (0.4%), this is likely masked by the sheer number of individuals who simultaneously meet the dose definition. All this evidence confirms the need-based definition is sorting individuals similarly to other definition.

Overall, these results suggest there is merit to a definition of dropout that expands on the current focus on number of sessions attended, to incorporate the child and family's overall state when they begin to seek services. There are however, limitations to the specific number of session cutoffs suggested in our definition (see discussion below - 4.5 Limitations). This thesis suggests an initial definition and a model for how a need-based definition can be developed.

4.3 Predictors of Dropout

According to the need-based definition, dropout was predicted by older child age, no involvement with CAS (as opposed to any involvement), lower scores on a measure of child symptomatology as well as the situational and temporal consistency of these issues and higher scores on measures of particular behaviors that put the child at risk (e.g., crime, violence towards oneself or others), the caregiver's ability to support the child and the strengths the child possesses (e.g., strong permanent relationships with family members and others, positive coping skills).

This is most similar to the dose definition in terms of predictors, with three predictors being the same (i.e., higher child psychiatric symptomatology, some involvement with CAS and higher caregiver needs). Interestingly, in the dose definition, dropout is predicted by younger age whereas in the need-based definition it is predicted by older age. The literature has found mixed evidence for the impact of age on dropout. The recent meta-analytic review by de Haan and colleagues found that older age was a predictor of dropout only in efficacy studies using a dose definition of dropout (2013). This did not match our findings with the dose definition. Some involvement with the CAS was associated with dropout in both the dose and need-based definitions. However, in an outpatient sample, child welfare involvement was not found to be a predictor of dropout across any of the three definitions studied (i.e., dose, clinician judgment, missed last appointment) (Warnick, Gonzalez, Robin Weersing, Scahill, & Woolston, 2012). Dropout, as defined by clinician judgement was most strongly associated with both a caregiver's lack of ability to support the child and a child's significant care requirements (e.g., level of monitoring needed for child to be safe, stability of service providers for child). Although dropout

by the need-based definition was also predicted by a high level of caregiver needs, the clinician judgement definition uniquely tapped into the notion of the child's care requirements.

Across all definitions, the only consistent predictor was caregiver needs. Caregiver needs are facets of the caregiver or their life that when low can act as a resource to the child, but when high indicate a low ability of the caregiver to support the child through mental health services (Lyons, 1999). A caregiver with low needs is able to adequately provide basic care for child and the household, be productively involved in the child's mental health service use and has the resources and supports available should they need to lean on them. In a meta-analytic study of dropout from children's mental health services, overall across both definitions (dose and clinician judgement) and both study types (efficacy and effectiveness), both number of total parent problems and poor parenting were significant predictors of dropout (de Haan, Boon, de Jong, Hoeve, & Vermeiren, 2013). These variables tap into the construct of caregiver needs, highlighting the issues caregivers are facing which limit their ability to meet the child's basic and mental health specific needs.

4.4 Theoretical Considerations

The use of the Socio-Behavioral model (Aday & Andersen, 1974) is appropriate for this thesis, given the data available and the aim of understanding, from intake, the population likely to dropout out of children's mental health services. However, researchers have suggested the mere identification of common intake variables does little to explain the reasons families drop out of treatment (de Haan et al., 2013). This is because, in part, the variables studied tend to be broad characteristics that do not suggest the mechanisms in dropping out (Kazdin, 1996). A variable like child sex may be related to dropout for a number of reasons, such as varying parental or clinician expectations, nature of common childhood disorders. For example, boys are

more likely to be diagnosed with externalizing disorders. Externalizing disorders are likely to have symptoms which are more of a burden to parents, motivating them to seek and remain in treatment more than internalizing symptoms would.

As well, little research in the dropout literature has been clearly driven by a conceptual model (Kazdin, 1996). Due to this, although there have been a number of studies of predictors of dropout, they have not added significantly to the understanding of dropout and how to diminish it. Ideally, research on dropout should strive to incorporate clear theoretical models in which to fit predictors. The Socio-Behavioral model itself is not enough to entirely understand dropout. Preferably, dropout research should eventually be based in both theoretical models to understand the intake factors which distinguish individuals are at increased risk for dropout, as well as process-oriented models to understand the mechanisms of dropout (de Haan et al., 2013). For example, the barriers to treatment model (Kazdin, Holland, Crowley, & Breton, 1997; Kazdin, Holland, & Crowley, 1997) suggests obstacles families may face which play a role in dropout (e.g., transportation to treatment, scheduling of appointments, cost of treatment, parental dislike of the therapist, changes to the parents job, housing or marital status).

Furthermore, the association of caregiver needs with dropout, regardless of definition, offers a clear focus for interventions aimed to improve engagement with children's mental health services. Many caregiver variables (e.g., caregiver involvement in planning of and understanding of treatment, caregiver monitoring of child, caregiver residential stability) are more amenable to change than static intake demographic variables, which has been suggested as an important focus in the dropout literature (de Haan et al., 2013). Our current study suggests there may be caregiver pre-treatment variables which can be targeted along with reminders and support to manage barriers. Some examples of this could be, impacting parental mental or physical health, housing

aid to increase residential stability, support in organizing a household, involvement in the planning process, and training to improve knowledge of children's strengths/problems and ability to supervise the child adequately.

4.5 Limitations

The overall thesis is limited in a number of ways. The principal study was an investigation of patterns of service use, and there are some variables relevant in the dropout literature that were not examined. It is possible some key predictors were not evaluated, as they were not, or could not, be collected via chart review, or from the administrative agency database. For example, this study did not contain information on ethnicity or socioeconomic status, which has been associated with dropout in previous research (Luk et al., 2001; McCabe, 2002; Warnick et al., 2012). Similarly, this study did not entail data on parents' experience of barriers to treatment which has been shown to greatly impact treatment attendance and adherence (Kazdin, Holland, & Crowley, 1997; Luk et al., 2001). Moreover, this study did not include measures of therapeutic relationship or other factors related to the treatment process as a whole, as it only involved intake data (Garcia & Weisz, 2002; Robbins, Turner, Alexander, & Perez, 2003).

Data were obtained from individuals grouped within different agencies. It is possible that clustering may have influenced the findings. Unfortunately, clustering is not easily accounted for in a discriminant function analysis. As well, accounting for clustering in the mixed effects logistic regression precluded the ability to achieve overall model chi square statistics to assess model fit. Cluster-robust standard errors that permit within-cluster error correlation presume that the number of clusters is large (Cameron, Gelbach, & Miller, 2008). However, when the number of clusters are low (i.e., five to 30), standard asymptotic tests can over-reject (Cameron et al., 2008). Given this, overall model statistics (e.g., Wald chi square) are not generated. This ensures

all significance estimates are conservative. However, agency differences were not a focus of the model.

Thirdly, optimal session number cutoffs were approximated as accurately as possible given the data available. However, the significantly reduced sample size when looking at completers who also had outcome data (i.e., a discharge CAFAS), imposed a limit on the accuracy of the number of session cutoffs obtained in the need-based definition. Assumptions and connections to the literature had to be made in order to arrive at the cutoffs selected, particularly when surmising a cutoff for the high need individuals with single parents. The selected cutoffs warrant verification and corroboration on larger samples and using universal outcome data. Nevertheless, the cutoff used for the low need group (8 sessions) is the same as suggested by Angold and colleagues as a cut-off for a minimum number of sessions needed for significant improvement in CAMHS (Angold, Costello, Burns, Erkanli, & Farmer, 2000). Further, the cut-off of 24 sessions for single parents is also similar to that shown by Angold and colleagues to be related to even greater improvements in CAMHS (Angold et al., 2000). Of note, Angold and colleagues did not provide any rationale for their choice of these cut offs whereas the current study used available data to make an evidence-informed decision (Angold et al., 2000).

Only single parent status was used to examine moderators of dose-response effect. It is possible that there are other variables (e.g., socio-economic status) which could be relevant but were not examined.

There were some individuals for whom parental marital status was unknown. Given that married parent families were more common than single parent families, for the purposes of these analyses we recoded all unknown marital status to be married parents. However, it is possible

that some of these families were in fact single parents which may have impacted the chosen cutoffs for each need level and some individuals dropout or completer status at discharge.

Additionally, this thesis study did not specifically investigate an attendance based definition, such as the missed last appointment definition analyzed by Warnick and colleagues. Such a definition considers families who miss their final scheduled appointment to have dropped out, regardless of the total number of sessions scheduled (Pekarik, 1992). This approach is a variant of those utilized in several previous studies in which attrition and engagement were conceptualized in terms of attendance to first, second, or third appointments (e.g., Gould et al., 1985; McCabe, 2002; McKay et al., 1996). The assumption in this definition is that the family is not sufficiently engaged in treatment and therefore less likely to keep their final scheduled appointment, however this is a difficult assumption to verify. Similar to the clinician-rated definition, families that missed their final scheduled session may have achieved their treatment goals and did not see the need for a final appointment.

Finally, the study did not entail any parent- or child-ratings of their perceptions of treatment completion or dropout. Such ratings would clarify when the clinician and family views on treatment goals and treatment completion were misaligned. Having this parent or child ratings would also ensure "completers" used to determine the optimal number of sessions for each need strata, were in fact individuals for whom there was common agreement (across the clinician and family) that treatment was complete.

4.6 Implications

This thesis suggests that a need-based definition may provide a superior method for defining dropout from children's mental health services. This definition may be particularly useful in community mental health agencies where the population of clients is heterogeneous and

no single evidence-based treatment (EBT) is offered. It may also be useful for naturalistic research studies comparing dropout across community mental health agencies, where clinician's standards for completion may vary by agency and the expectation may often be to treat until the family feels they can manage on their own, rather than a clear standard of clinical change.

Findings from this study and others (de Haan et al., 2013; Warnick et al., 2012) confirm that the definition of dropout used will impact both the prevalence and predictors of dropout from children's mental health services. Although there are some commonalities across predictors of differing definitions of dropout, there are also differences. There may not be a single ideal definition of dropout, but rather, the definition chosen must be relevant based on the purpose of application. Researchers, clinicians and policy makers alike must be aware of the impact of the chosen definition, and clearly document and justify the chosen methodology.

4.7 Future Directions

Going forward, the specifics of the need definition should be confirmed using a different data set. Most importantly, the selected cutoffs in Chapter 2 warrant verification and corroboration on larger samples with outcome data. With a solidified set of cutoffs, the need definition can be applied to alternative datasets to corroborate the resulting predictors of dropout using the need-based definition in this study. As well, ideally this definition would be applied to more complete datasets, which contain a wider variety of variables at intake, especially those often analyzed in other studies of dropout from children's mental health services (e.g., ethnicity, socio-economic status, parental education level). It is likely that static pre-treatment variables, as well as dynamic barriers experienced during treatment, together predict dropout. Furthermore, research on dropout should be expanded to examine process-oriented variables (e.g., therapeutic alliance, perceived barriers to treatment) and decision making processes and other mechanisms

that lead to dropout. It is reasonable to assume these factors interact with existing pre-treatment factors which make a family vulnerable to dropout. This will suggest areas to influence and target for intervention. De Haan and colleagues suggest that in an ideal definition of dropout, we would measure both the opinion of the therapist, as well as that of the parent and potentially the patient, depending on their age. As well, de Haan and colleagues (2013) write that if this is done in combination with an objective instrument to measure changes in psychiatric problems, or success in achieving therapy goals, the most accurate assessment of dropouts will be created. This thesis has begun work toward this ideal dropout definition, although there is room for improvement.

4.8 Conclusion

This study shows the need for increased efforts to improve both definitions of dropout and treatment adherence for children accessing mental health services. In particular, this study suggests definitions of dropout would benefit from incorporating notions of need. Furthermore, treatment engagement interventions should focus efforts on caregivers needs to increase children's adherence to treatment. Future research addressing the limitations of this study are warranted to gain a better understanding into the complex reasons that surround dropout from children's mental health services. Overall, efforts to understanding, predict and reduce dropout will benefit youth, their families and the mental health agencies that serve them.

4.9 References

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Appendix A: Mental Health Session Intensity Groupings

Table A1 shows the different types of sessions grouped into low, medium, and high service use intensity.

Table A1.

Service use intensity groupings for types of mental health sessions

Service Use Intensity	Type of Session
Low	Drop-in resource centre, intake assessment, brief therapy, group therapy, Parent training
Medium	Diagnosis assessment, professional assessment consultation, specialized assessment, assessment other, school-based educational intervention, outreach services, evidence-based interventions, family counselling, individual counselling, medication monitoring, outpatient services, play-art therapy, targeted intervention, intervention-other, crisis intervention, crisis counselling, mobile crisis services, trauma crisis stabilization
High	Case management, case conferencing, multi-professional teams, inpatient services, residential treatment, intensive home-based interventions, treatment foster care, wraparound, day treatment, in-home respite services, out-of-home respite services, crisis residential – emergency shelters

Appendix B: Categorizing Overall Service Use Intensity for Nature of Sessions

The number of sessions each child had in the low, medium, and high intensity categories were each converted into percentages of overall service use. Table B1 shows examples of classification scenarios for overall service use intensity. If a child received more than one type of intensity during their episode of care, then the intensity with the highest percentage of sessions was used to determine the overall intensity of service use. If a child received an equal percentage of more than one type of intensity, then the higher intensity received was used to determine their overall intensity of service use.

Table B1.

Percent of overall sessions and classification into either overall low, medium, or high intensity of service use.

Overall Intensity Grouping	Percent of Sessions (%)		
	Low	Medium	High
Low	100	0	0
Low	50-100	0-49	0-49
Medium	0	100	0
Medium	0-49	50-100	0-49
High	0	0	100
High	0-49	0-49	50-100

Appendix C: Child and Adolescent Needs and Strengths (CANS) Items by Dimension

Table C1.

Dimension	Item Name	Item Description
Child Problem Presentation	Psychosis	Evidence of symptoms of psychiatric disorders with a known neurological base. DSM-IV disorders included on this dimension are Schizophrenia and Psychotic disorders (unipolar, bipolar, NOS). The common symptoms of these disorders include hallucinations, delusions, unusual thought processes, strange speech, and bizarre/idiosyncratic behavior.
	Attention Deficit/Impulse Control	Symptoms of Attention Deficit and Hyperactivity Disorder and Impulse Control Disorder would be rated here. Inattention/distractibility not related to opposition would also be rated here.
	Depression	Evidence of symptoms of a change in emotional state and can include sadness, irritability and diminished interest in previously enjoyed activities.
	Anxiety	Evidence of symptoms associated with Anxiety Disorders characterized by either worry, dread, or panic attacks.
	Oppositional Behavior (Compliance with authority)	How the child or adolescent relates to authority. Oppositional behavior is different from conduct disorder in that the emphasis of the behavior is on non-compliance to authority rather than on seriously breaking social rules, norms and laws.
	Emotional Control	Child or adolescent's difficulties in regulating their emotional responses.
	Antisocial Behavior (Compliance with society's rules)	Antisocial behaviors like shoplifting, lying, vandalism, cruelty to animals, and assault. This dimension would include the symptoms of Conduct Disorder as specified in DSM-IV.
	Substance Abuse	Use of alcohol and illegal drugs, the misuse of prescription medications and the inhalation of any substance for recreational purposes. This rating is consistent with DSM-IV Substance-related Disorders.
	Adjustment to Trauma	Reactions of children and adolescents to any of a variety of traumatic experiences from child abuse

		and neglect to forced separation from family. This dimension covers both adjustment disorders and post-traumatic stress disorder from DSM-IV.
	Attachment	Child's attachment in significant parental relationships (Use only for children less than 6 years old).
	Anger Control	Child or adolescent's ability to identify and anger their anger when frustrated.
	Situational Consistency of Problems	Variation in problem presentation across different situations and environments in the child/youth's life (e.g., home, and school)
	Temporal Consistency of Problems	Duration of mental health problems experienced by the child or youth. Include both problems (i.e., symptoms) and risk behaviors in this rating.
Child Risk Behaviors	Danger to Self	Describes both suicidal and significant self-injurious behavior.
	Danger to Others	This rating includes actual and threatened violence. Imagined violence, when extreme, may be rated here.
	Elopement	In general, to classify as a runaway or elopement, the child is gone overnight or very late into the night. Impulsive behavior that represents an immediate threat to personal safety would also be rated here.
	Sexually Abusive Behavior	Sexually abusive behavior includes both aggressive sexual behavior and sexual behavior in which the child or adolescent takes advantage of a younger or less powerful child through seduction, coercion, or force.
	Social Behavior	Problematic social behaviors (socially unacceptable behavior for the culture and community in which he/she lives) that put the child or adolescent at some risk (e.g., not excessive shyness).
	Crime/Delinquency	Criminal behavior and status offenses that may result from child or youth failing to follow required behavioral standards (e.g., truancy). Sexual offenses should be included as criminal behavior.
Child Functioning	Intellectual/Developmental	Child or adolescent's cognitive/intellectual functioning.
	Physical/Medical	Child or adolescent's health problems and/or chronic/acute physical conditions.

	Sleep Functioning	Child/youth's sleep pattern over the last 30 days. Quality and quantity is taken into account.
	Family Functioning	Impairments such as conflict between family members, domestic violence etc. The definition of family should be from the perspective of the child or youth (i.e., who does the child consider to be family). Family functioning should be rated independently of the problems experienced by the child.
	School Achievement	Child or adolescent's academic performance in school.
	School Behavior	Behavior of the child or youth in school, even if special efforts have been made, i.e., problems in a special education class.
	School Attendance	Child or adolescents pattern of coming to and stay at school for each required school day.
	Sexual Development	Issues around sexual development including developmentally inappropriate sexual behavior and problematic sexual behavior.
Care Intensity and Organization	Monitoring	Level of adult monitoring needed to address the safety and functioning need of the child or youth.
	Treatment	Intensity of the treatment needed to address the problems, risk behaviors, and functioning of the child or youth.
	Transportation	Level of transportation required to ensure that the child or youth could effectively participate in his/her own treatment.
	Service Permanence	Stability of the service providers who have worked with the child and/or family.
Caregiver Needs	Physical/Behavioral Health	Medical, physical, mental health, and substance abuse challenges faced by the caregiver(s).
	Supervision	Caregiver's capacity to provide the level of monitoring and discipline needed by the child/youth.
	Involvement	Level of involvement the caregiver(s) has in planning and provision of mental health and related services.
	Knowledge	Caregiver's knowledge of the specific strengths of the child and any problems experienced by the child and their ability to understand the rationale for the

		treatment or management of these problems.
	Organization	Ability of the caregiver to participate in or direct the organization of the household, services, and related activities.
	Financial Resources	Income and other sources of money available to caregivers that can be used to address family needs.
	Natural Supports	Caregiver's resources to support caring for their child. If a family has money, those funds can be used to buy help. In the absence of money, families often rely on social supports to help out during times of need. The evaluation of natural resources is used to rate the availability of resources related to social support (e.g., fellow church member, extended family).
	Residential Stability	Caregivers' current and likely future housing circumstances.
	Safety	Safety of the assessed child. It does not refer to the safety of other family or household members based on any danger presented by the assessed child.
Child Strengths	Family	All biological or adoptive relatives with whom the child or youth remains in contact along with other individuals in relationships with these relatives.
	Interpersonal	Interpersonal skills of the child or youth both with peers and adults.
	Relationship Permanence	Stability of significant relationships in the child or youth's life. This likely includes family members but may also include other individuals.
	Educational	Strengths of the school system and may or may not reflect any specific educational skills possessed by the child or youth.
	Vocational	Adolescent's vocational or pre-vocational skills or work experience. This rating is reserved for adolescents and is not applicable for children 12 years and under.
	Well-Being	Psychological strengths that the child or adolescent might have developed including both the ability to enjoy positive life experiences and manage negative life experiences. This should be rated independent of the child's current level of distress.
	Optimism	Child or adolescent's sense of him/herself in his/her own future. This is intended to rate the child's positive future orientation.

Spiritual/Religious	Child or adolescent's and their family's involvement in spiritual or religious beliefs and activities.
Talent/Interests	Any talent, creative or artistic skill a child or adolescent may have including art, theatre, music, athletics, etc.
Inclusion	Child or adolescent's level of involvement in the cultural aspects of life in his/her community.

Appendix D: Normalized Weighting Adjustment

Weighting adjustment is a commonly applied corrective technique when a sample is not representative of the population it came from, either accidentally or due to the sampling design (Kalton & Flores-cervantes, 2003). When an individual is sampled with unequal probability of selection, the sample weight represents the number of individuals in the population that each individual in the sample represents (Korn & Graubard, 1995). A weight is, most simply, the inverse of the probability of selection (Kish, 1965). Given the sampling design used in the principal study, normalized weights must be applied to calculations performed on the chart review sample if generalization are to be made to the entire principal study population. Normalized weights are calculated by dividing the raw weight (weight based on total population size) by its mean, which preserves the sample size (Hahs-vaughn, 2005). With a normalized weight, those individuals in an under-represented group receive a weight larger than 1 and those in over-represented groups get a weight less than 1. Since normalized weights sum to the sample size, they address sample size sensitivity issues and ensure standard error estimates are correct given a simple random sample (Hahs-vaughn, 2005). However, it must be noted that normalized weighting alone does not account for complex sampling designs, additional steps must be taken to account for design effects (Thomas, Heck, & Bauer, 2005).

Throughout the analyses, normalized weights, based on the stratification of age (i.e., 5-9 years and 10-13 years) and sex from each pattern of service use (i.e., minimal, acute, brief-episodic, intensive, ongoing-episodic) within each agency, were applied to make generalizations from the chart review sample to the principal study population.

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Appendix E: Differences in Distributions of Patterns of Service Use across Agencies

Table E1.

Distribution of Patterns of Service Use by Agency

Agency	Pattern of Service Use				
	Minimal	Acute	Intensive	Brief-Episodic	Ongoing-Episodic
	n (%)	n (%)	n (%)	n (%)	n (%)
CMHC1	349 (41.3%)	239 (28.3%)	176 (20.8%)	35 (4.1%)	47 (5.6%)
CMHC2	243 (34.7%)	137 (19.5%)	114 (16.3%)	113 (16.1%)	94 (13.4%)
CMHC3	323 (44.6%)	168 (23.2%)	86 (11.9%)	106 (14.6%)	42 (5.8%)
CMHC4	1450 (71.7%)	265 (13.1%)	161 (8.0%)	86 (4.3%)	60 (3.0%)
CMHC5	632 (47.2%)	322 (24.1%)	193 (14.4%)	107 (8.0%)	84 (6.3%)
Overall	2997 (53.2%)	1131 (20.1%)	730 (13.0%)	447 (7.9%)	327 (5.8%)

Note: N=5632, CMHC=Child Mental Health Centre.

Appendix F: Unweighted Vs. Weighted Sample Demographic Characteristics

Table F1.

Comparison of Chart Review Sample Characteristics Weighted and Unweighted

Demographic Characteristics	Weighted Sample[a] % (n) or M (SD)	Unweighted Sample % (n) or M (SD)
Predisposing Child Characteristics		
Sex (% male)	62.2% (389)	62.6% (391)
Age (M ± SD in years)	9.4 (2.5)	9.2 (2.5)
Enabling Characteristics		
Parent Marital Status		
Married/Common Law/Living Together	60.9% (381)	57.6% (360)
Single Parent	36.8% (230)	39.7% (248)
Unknown/Other	2.3% (14)	2.7% (17)
Number of Household Members	4.1 (1.2)	4.1 (1.2)
Need Characteristics		
CAS Involvement		
No Involvement	64.2% (402)	58.7% (367)
Investigation	9.7% (61)	11.4% (71)
Some Involvement	10.9% (68)	13.0% (81)
Supervision/Temporary Care/Crown Ward	15.1% (95)	17.0% (106)

Note: N=625, CAS = Children's Aid Society

[a]Weighted used was a normalized weight which retains the sample size, rather than a raw weight which weights up to the population size. The normalized weight is calculated by dividing the raw weight by its mean. Normalized weights address sample size sensitivity issues, and ensures that standard error estimates are correct, while still incorporating sample weights (Hahs-vaughn, 2005).

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Appendix G: Comparison of Scoring Methods for the CANS

Two methods of scoring the CANS were compared to determine the best way to use the CANS in helping sort individuals by need. Given an interest in retaining relatively large sample sizes, only two need groups were created.

One method was a simple summation of the CANS item scores, where scores could range between 0-150 and higher scores indicate worse functioning. In the sample the scores ranged from 13-83. A median split at a score of 41 was used to divide high from low need. This resulted in a low need group of 298 individuals and a high need group of 328 individuals.

The second method involved use of the CANS level-of-care algorithm. The levels of care algorithm includes the following categories: 0) Treatment not needed 1) traditional clinic options (outpatient, pharmacological treatment), 2) supportive case management, 3) intensive case management, 4) home and community services and 5) residential treatment. Frequencies for each of these groups are shown in Table G1. Algorithm groups were combined as follows: (A)Low Need (n =360): Treatment not needed, Clinic option, Supportive Case Management, (B) High Need (n=265): Intensive case management, Home and community services, Residential.

Similarity of categorization based on use of the CANS decision support algorithm versus simple summation of CANS using crosstabs was compared (see Table G2). The two methods sorted individuals similarly, resulting in high true positives and negatives. As well, based on a chi square test of independence, the relationship between the two methods was significant X^2 (1, 625) =173.81, p=.000, indicating similar sorting by each method of scoring the CANS.

Table G1.

CANS Algorithm Level of Care Frequencies

Level of Care	Frequency % (n)
Treatment not needed	1.1 (7)
Clinic option	26.4 (165)
Supportive case management	30.1 (188)
Intensive case management	33.8 (211)
Home and community based services	7.3 (45)
Residential	1.4 (9)

Note: N=625.

Table G2.

CANS Summation compared to CANS Algorithm

	CANS Summation – Row % (n)	
CANS Algorithm	Low Need	High Need
Low Need	70.3% (253)	29.7% (107)
High Need	17.0% (45)	83.0% (220)

Note: N=625. CANS Summation: Low Need= total CANS score below 41 High Need= total CANS score 41 and higher. CANS Algorithm: Low Need= Treatment not needed, Clinic option, Supportive Case Management, High Need= Intensive case management, Home and community services, Residential.

Relationship of CANS groups to child psychopathology at Intake: The two methods of scoring the CANS was compared to a validated measure of child functioning also completed at intake, the BCFPI.

In order to do this comparison using crosstabs, the BCFPI outcome score was dichotomized. In this study, the BCFPI data was dichotomized to represent a “good” or “poor” functioning of the child by counting the number of composite scales with a T-score in the clinical range, over 70; this results in two groups 0-1 or 2-3 scales in the clinical range (Meyers, 2006). Both methods of sorting need with the CANS mapped similarly onto dichotomized BCFPI

scores, as indicated by significant chi squares X^2 (1, 395) =75.18, *p*=.000 and X^2 (1, 395) =51.79, *p*=.000 for each of the CANS summation and CANS algorithm methods respectively. (See Table G3). Given all results were similar with both methods, use of the CANS algorithm was chosen as it has been used in other studies (Chor, McClelland, Weiner, Jordan, & Lyons, 2012; Epstein, Schlueter, Gracey, Chandrasekhar, & Cull, 2015).

Table G3.

CANS Summation vs CANS Algorithm by Count of BCFPI Scales with T-Score over 70

	Count of BCFPI Scales with T-Score >70	
CANS Summation	% (n)	% (n)
Low Need	77.8% (123)	22.2% (35)
High Need	33.3% (79)	66.7% (158)
CANS Algorithm		
Low Need	67.1% (149)	32.9% (73)
High Need	30.6% (53)	69.4% (120)

Note: N=395, as not every family had completed a BCFPI.

References

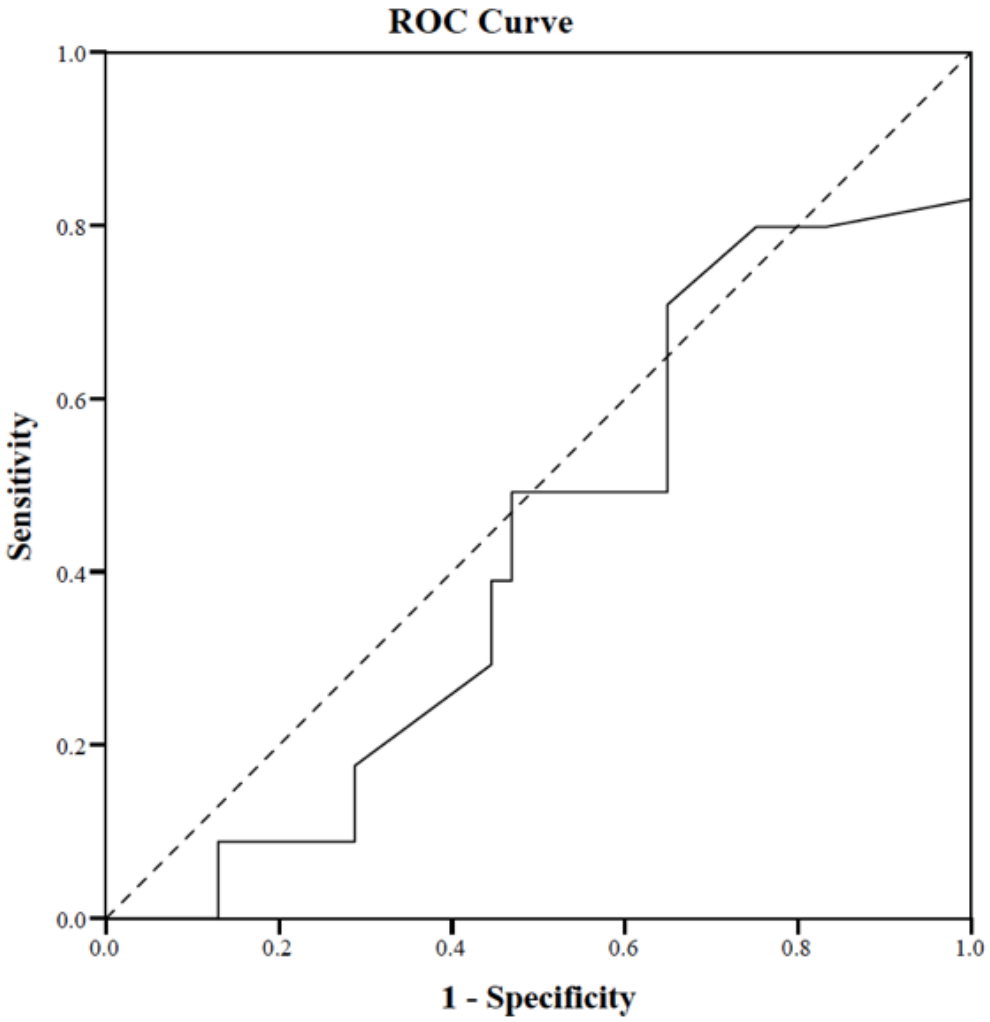
Chor, K. H. B., McClelland, G. M., Weiner, D. a., Jordan, N., & Lyons, J. S. (2012). Predicting outcomes of children in residential treatment: A comparison of a decision support algorithm and a multidisciplinary team decision model. *Children and Youth Services Review*, *34*(12), 2345–2352. http://doi.org/10.1016/j.childyouth.2012.08.016

Epstein, R. A., Schlueter, D., Gracey, K. A., Chandrasekhar, R., & Cull, M. J. (2015). Examining Placement Disruption in Child Welfare. *Residential Treatment for Children & Youth*, *32*(3), 224–232. http://doi.org/10.1080/0886571X.2015.1102484

Meyers, S. (2006). *Final Report to The Provincial Centre of Excellence for Child and Youth Mental Health at CHEO. Program Evaluation of Child & Youth Wellness Centre of Leeds & Grenville ' s Community Counselling Program 2005 Made Possible by Program Evaluation Grant*.

Appendix H: Receiver Operating Curve for High Need

Figure H1. Receiver Operating Curve (ROC) for those coded as High Need at intake. The outcome is a child with a good vs poor CAFAS score and the predictor is the number of sessions attended.



Appendix I: Comparison of Distribution of Need Definition Completers and Dropouts With and Without a CAFAS.

The CAFAS is administered by the treating clinician following three months of service, and then is repeated every three months thereafter. For this reason, the CAFAS represented a biased indicator of outcome functioning, as those who attend services for less than three months are unlikely to have a complete CAFAS. Table I1 details the sample characteristics of individuals with and without a complete discharge CAFAS.

The CAFAS was used as an outcome measure in determining cutoffs for the Need definition. To understand the extend of possible bias due to case missing CAFAS data, the distribution of individuals in the final need categories was compared to the distribution of individuals with a CAFAS (see Table I2).

The distribution was similar across individual with a CAFAS and all completers in each of the three groups, low need, high need with married parents and high need with single parents. This was indicated by a non-significant chi square when comparing the distribution of those with a CAFAS to the expected overall distribution X^2 (5, 163)=4.33, p=0.50. This suggests the use of the sample with a CAFAS to determine the cutoffs was appropriate.

Table I1.

Comparison of Sample Characteristics for those with and without a Discharge CAFAS

Demographic Characteristics	With a CAFAS[a] N=58 % (n)	Without a CAFAS N=105 % (n)
Sex (% male)	62.9 (36)	68.0 (72)
Age (M ± SD in years)	8.8 (2.2)	9.0 (2.4)
Parent Marital Status		
Married/Common Law/Living Together	69.3 (40)	62.0 (65)
Single Parent	26.7 (15)	33.1 (35)
Unknown/Other	4.0 (2)	4.8 (5)
CAS Involvement		
No Involvement	68.3 (40)	65.1 (69)
Investigation	8.1 (5)	7.3 (8)
Some Involvement	6.1 (4)	13.0 (14)
Supervision/Temporary Care/Crown Ward	17.4 (10)	14.6 (16)
Number of Household Members	4.2 (1.2)	4.1 (1.1)
Number of Sessions	25.8 (23.2)	13.6 (18.5)

Note: CAFAS=Child and Adolescent Functional Assessment Scale, CAS = Children's Aid Society

[a]Normalized weighting applied.

Table I2.

Comparison of Distribution Around Cutoffs of Individuals With and Without a CAFAS

	Low Need[a] <8 Sessions	Low Need >8 Sessions	High Need & Married <16 Sessions	High Need & Married >16 Sessions	High Need & Single <24 Sessions	High Need & Single >24 Sessions
With a CAFAS N=58 n (row %)	15 (25.6)	23 (39.3)	4 (6.7)	10 (17.8)	2 (4.0)	4 (6.5)
Overall Completers N=163 n (row %)	58 (35.7)	59 (36.5)	12 (7.3)	18 (10.7)	10 (5.9)	6 (3.9)

Note: CAFAS= Child and Adolescent Functional Assessment Scale.
[a]Normalized weighting applied.

Appendix J: Correlations between CANS Dimensions and BCFPI Scales

Table J1 shows the correlations between the CANS dimension scores and BCFPI scales. This provides support for the use of the CANS dimensions as predictors, given they relate closely to a widely used and psychometrically sound measure.

Table J1.

Correlations between CANS Dimensions and BCFPI Scales

	BCFPI Composite Scales				
CANS Dimensions	Externalizing	Internalizing	Total Mental Health Problems	Global Child Functioning	Global Family Functioning
Problem Presentation	.547**	.360**	.570**	.492**	.547**
Risk Behaviors	.371**	.073	.275**	.277**	.383**
Functioning	.347**	.168**	.325**	.427**	.338**
Care Intensity and Organization	.353**	.081	.269**	.262**	.323**
Caregiver Strengths	.150**	.062	.133*	.045	.120
	.131*	-.064	.039	.074	.097

Note: CANS=Child and Adolescent Needs and Strengths, BCFPI=Brief Child and Family Phone Interview, *p<.05, **p<.01

Appendix K: Parameters of Each Logistic Regression Model by Definition

Table K1.

Dose Definition Logistic Regression Model

Dose Definition	Odds Ratio	Robust Standard Error	z	P>|z|	95% Confidence Interval	
Child Age	0.86	0.04	-2.73	0.01	0.78	0.96
Child Sex[a]	1.34	0.66	0.60	0.55	0.51	3.54
Marital Status[b]	1.31	0.21	1.67	0.09	0.96	1.80
CAS Involvement[c]						
Investigation	0.68	0.24	-1.09	0.28	0.35	1.35
Some Involvement	0.51	0.14	-2.51	0.01	0.30	0.86
Supervision/Temporary Care/Crown Ward	0.40	0.20	-1.85	0.06	0.15	1.06
Household Members	0.93	0.07	-0.93	0.35	0.80	1.08
CANS Problem Presentation	0.74	0.10	-2.13	0.03	0.56	0.98
CANS Risk Behavior	0.95	0.19	-0.24	0.81	0.64	1.41
CANS Functioning	0.92	0.22	-0.35	0.72	0.56	1.48
CANS Care Intensity and Organization	0.58	0.18	-1.73	0.08	0.31	1.07
CANS Caregiver	1.81	0.12	8.51	0.00	1.58	2.07
CANS Strengths	1.13	0.13	1.08	0.28	0.90	1.41

Note: N=521, CAS=Children's Aid Society, CANS=Child and Adolescent Needs and Strengths Scale.

Reference categories for the predictors are:

[a] Child sex = girls.

[b]Marital Status = single parent family.

[c]CAS Involvement=No involvement.

Table K2.

Clinician Judgment Definition Logistic Regression Model

Clinician Judgement Definition	Odds Ratio	Robust Standard Error	z	P>|z|	95% Confidence Interval	
Child Age	1.08	0.05	1.86	0.06	1.00	1.18
Child Sex[a]	0.88	0.13	-0.84	0.40	0.66	1.18
Marital Status[b]	0.93	0.14	-0.47	0.64	0.69	1.25
CAS Involvement[c]						
Investigation	2.07	1.13	1.33	0.18	0.71	6.01
Some Involvement	0.97	0.22	-0.13	0.90	0.62	1.51
Supervision/Temporary Care/Crown Ward	1.00	0.33	0.00	1.00	0.52	1.91
Household Members	0.92	0.04	-1.70	0.09	0.84	1.01
CANS Problem Presentation	0.92	0.05	-1.47	0.14	0.82	1.03
CANS Risk Behavior	0.85	0.09	-1.53	0.13	0.68	1.05
CANS Functioning	1.03	0.09	0.32	0.75	0.86	1.23
CANS Care Intensity and Organization	1.69	0.26	3.49	0.00	1.26	2.28
CANS Caregiver	1.57	0.17	4.16	0.00	1.27	1.94
CANS Strengths	1.05	0.05	1.02	0.31	0.96	1.16

Note: N=521, CAS=Children's Aid Society, CANS=Child and Adolescent Needs and Strengths Scale.

Reference categories for the predictors are:

[a] Child sex = girls.

[b]Marital Status = single parent family.

[c]CAS Involvement=No involvement.

Table K3.

Need Definition Logistic Regression Model

Need Definition	Odds Ratio	Robust Standard Error	z	P>|z|	95% Confidence Interval	
Child Age	1.10	0.35	3.10	0.00	1.03	1.17
Child Sex[a]	1.30	0.33	1.05	0.29	0.80	2.13
Marital Status[b]	0.69	0.34	-0.74	0.46	0.26	1.83
CAS Involvement[c]						
Investigation	0.55	0.36	-0.91	0.36	0.15	1.99
Some Involvement	0.25	0.13	-2.70	0.01	0.09	0.68
Supervision/Temporary Care/Crown Ward	0.54	0.21	-1.61	0.11	0.25	1.15
Household Members	0.99	0.10	-0.13	0.90	0.81	1.20
CANS Problem Presentation	0.81	0.04	-4.89	0.00	0.74	0.88
CANS Risk Behavior	1.75	0.30	3.24	0.00	1.25	2.45
CANS Functioning	0.80	0.12	-1.47	0.14	0.60	1.07
CANS Care Intensity and Organization	0.63	0.18	-1.58	0.11	0.36	1.12
CANS Caregiver	2.09	0.42	3.62	0.00	1.40	3.11
CANS Strengths	1.28	0.10	3.09	0.00	1.10	1.50

Note: N=521, CAS=Children's Aid Society, CANS=Child and Adolescent Needs and Strengths Scale.

Reference categories for the predictors are:

[a] Child sex = girls.

[b]Marital Status = single parent family.

[c]CAS Involvement=No involvement.

Appendix L: Regression Fit Indices

Table L1 presents different fit indices for the regressions predicting each of the three dropout definitions. The model predicting the dose definition of dropout had the best fit to the data; the clinician judgement or need-based definitions had similar fit to the data.

Table L1.

Model Fit Indices by Dropout Definition

Model	ll(model)	df	AIC	BIC
Dose	-107.67	4	223.34	240.37
Clinician Judgement	-339.422	4	686.84	703.87
Need-Based	-294.18	4	596.36	613.38

Note: N=521, ll =log likelihood AIC =Akiake Information Criteria; BIC = Bayesian Information Criteria

Curriculum Vitae

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Education

2014 – present M.Sc. Candidate, Clinical Psychology, Western University, London, Ontario
2010-2014 Bachelor of Arts (Honours Psychology), McGill University, Montreal, Quebec

Honours and Awards

2015	Pediatric Oncology Group of Ontario 2015 Multidisciplinary Symposium on Childhood Cancer, Poster Presentation Winner
2014-2015	Canadian Graduate Scholarship – Master's, Social Science Health Research Council (SSHRC)
2014-2016	Western Graduate Research Scholarship
2014	McGill Honour Thesis Undergraduate Poster Presentation Winner
2013	McGill Dow-Hickson Academic Scholarship
2010-2014	McGill Dean's Honour List

Related Work Experience

2015-present	Research Assistant, Pediatric Oncology, Victoria Hospital
Winter 2016	Graduate Teaching Assistant: Psychology 2042 – Exceptional Children: Behavioural Disorders, Western University
Fall 2015	Graduate Teaching Assistant: Psychology 2302 – Abnormal Child Psychology, Western University
Summer 2015	Co-Instructor: Psychology 3301 – Clinical Psychology, Western University
Winter 2015	Graduate Teaching Assistant: Psychology 1000 – Introduction to Psychology, Western University
Fall 2014	Graduate Teaching Assistant: Psychology 2032 – Crime and Corrections, Western University

Poster Presentations

Dossett, K., Cataudella, D., Fernandez, C., Sung L., Johnston, D., Zelcer S. (October, 2015) Development of the Pediatric Advanced Care Quality of Life Scale (PAC-QoL): Scale Administration and Evaluation of Face and Structural Validity. Presented at the Pediatric Oncology Group of Ontario, 2015 Multidisciplinary Symposium on Childhood Cancer, Toronto, Ontario.

Dossett, K., Kirmayer, K., & Dirks, M. (April, 2014). Social competence in emerging adult's same-sex friendships: The challenging and relevant situations. Presented at the McGill Undergraduate Psychology Poster Day, McGill University, Montreal, Quebec.

Tuttle, A., Dossett, K., Gerstein, L., Pearl, R., Sukosd, M., Leger, P., Yachin, D., Austin, J. & Mogil, J. (February, 2013). Evaluating how pain alters murine “friendship” using a novel paradigm: Effects of stress. Presented at the Pain Day McGill, Montreal, Quebec.